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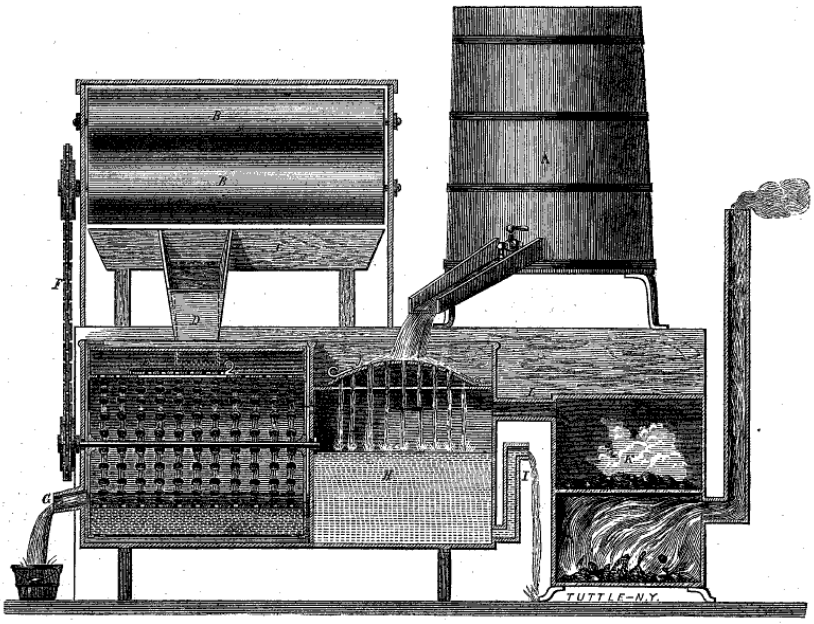
Improved Method of Clarifying Saccharine Sirup.

The clarifying of the juice of cane and other vegetable substances which is to be manufactured into sirups and sugars is, in a commercial point of view, very important. The engravings represent an apparatus for doing this by chemical means which are at once simple, cheap, and effective. A description of the parts will enable any one to understand its construction and operation. On an elevated platform is a water tank, A, and the rollers, B, for expressing the juice. Under the rollers is a trough, C, from which leads a spout or conduit, D, to conduct the juice to the juice receptacle, E, in which revolves a perforated cylinder, having curved radial buckets on its circumference, by which means the juice is constantly stirred and lifted, and which is rotated by means of a shaft and the chain, F, leading from the rollers or from any other source of power. The juice is discharged at G, and the receptacle, E, has an air tight cover. H is the purifying box filled to the level of the pipe, I, with water, which is received through a convex perforated cover, J, from the tank, A. By means of the incline of this cover and its minute perforations the water descends into the purifying box in a shower or spray. The oven, K, holds a quantity of sulphur heated by a fire beneath, the fumes or vapors of which pass in the direction of the arrows through the connecting pipe, L, into the purifying chamber where they are cleansed from impurities, and thence into the receptacle, E, by apertures in the heads of the cylinder where they mix intimately with the agitated particles of the juice and finally escape into the atmosphere through the spout, G. A sliding opening over the cylinder in E and a faucet at the bottom offer facilities for cleaning, as also does the hinged air tight cover of E and that of H, also hinged.



JORDAN'S CANE JUICE PURIFIER.

This simple apparatus has been in use in Louisiana for over two years with perfect s uccess, the products of the plantations where it was employed bringing a price above the highest market figure, the molassses itself being equal to what is called the "golden sirup." It is cheap and easily applied to ordinary mills, requiring no attendant but the engineer or firemen and using but about ten per cent of the amount of sulphur formerly used in other machines. It purifies the sulphur before its vapors come in contact with the cane juice, preventing clamminess or gumming, which hinders a free granulation of the sugar; thus purified it is ready to absorb all the impurities of the juice while it has none of its own to give, leaving the juice to pass into the receiver ready for the kettles. The fuel necessary to heat the sulphur is so little that its cost is hardly worthy mention. The apparatus is as well adapted to maple sap and the juice of sorghum or beets as to that of the cane.

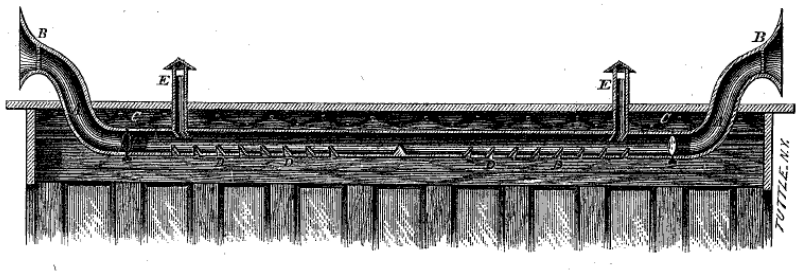
Last patent on improvements dated April 2, 1867, issued to William A. Jordan, of New Orleans. For all information required apply to H. G. Heartt, 29 Commercial Place, New Orleans, La. [See advertisement on another page.]

Graves' Ventilating Apparatus.

This invention relates to devices for ventilating railroad cars, vessels, vehicles, public buildings, dwellings, etc., and consists of one or more metal or other pipes having openings at their ends for the admission of pure air and the emission of foul air. The engraving is a view of the top of a railway car with one ventilating pipe *in situ*. A is a tube running along under the roof of the car, the ends projecting through the roof and having bell mouths, the interior of which are guarded by diaphragms of fine wire gauze, seen at B, for arresting dust, sparks, and other suspended impurities. Dampers or valves, C, are placed at either end for regulating and controlling the passage of the air. At the middle of the pipe is a wedge-shaped partition which rises from the lower side to above the center of the tube's diameter. On each side of this is a series of crescent shaped openings, D, in the bottom of the tube, furnished with deflectors placed in an inclined position toward either end of the pipe. E E represent vertical pipes passing through the roof, having ventilating cowls on their tops, and the portion extending into the horizontal pipe being inclined toward the deflectors, D. These vertical pipes are supplementary outlets for the foul air.

The operation is simple. It will be seen that which ever end of the car may be going forward the external air rushes into the bell mouth, and being deflected downward by the guides, D, enters the car and drives out and replaces the foul air, which escapes through the openings, D, on the other side of the central partition and of the mouth, B, or the pipe E. A portion of the air received in the front end of the pipe will continue its passage over the central partition and assist by its current in producing additional draft to expel the foul air from the car.

As applied to buildings this apparatus may be a straight instead of a curved pipe, and also in those cars which have a raised roof or skylight. In vessels it could be so applied that the end openings could be raised high enough to keep out the water. It would seem to be well adapted to our monitors, at least as an auxiliary to the fan driven by steam. It could be attached to cars, churches, and other places of public resort near the floor or at any desired hight, as well as near the ceiling.



GRAVES' VENTILATING APPARATUS.

The apparatus appears to be constructed on scientific principles and calculated to serve a very useful purpose. It was patented through the Scientific American Patent Agency April 16, 1867, by Robert C. Graves, Barnesville, Ohio, who may be addressed by all interested in the subject.

The Pneumatic Dispatch.

At a recent meeting of the Association for the advancement of Science and Art, in the Cooper Institute, New York City, Dr. Gilbert delivered a lecture on atmospheric railways, and their utility in facilitating locomotion, the transmission of letters and the transportation of goods, especially in large cities. He first made some observations on the properties of air, demonstrating its weight—a column of air between forty and fifty miles high being equal to a column of water thirty-two feet, or of mercury twenty-eight to thirty inches in hight. He showed also the effects of the expansion of air, and explained how some of these properties are applied in the construction of atmospheric railroads.

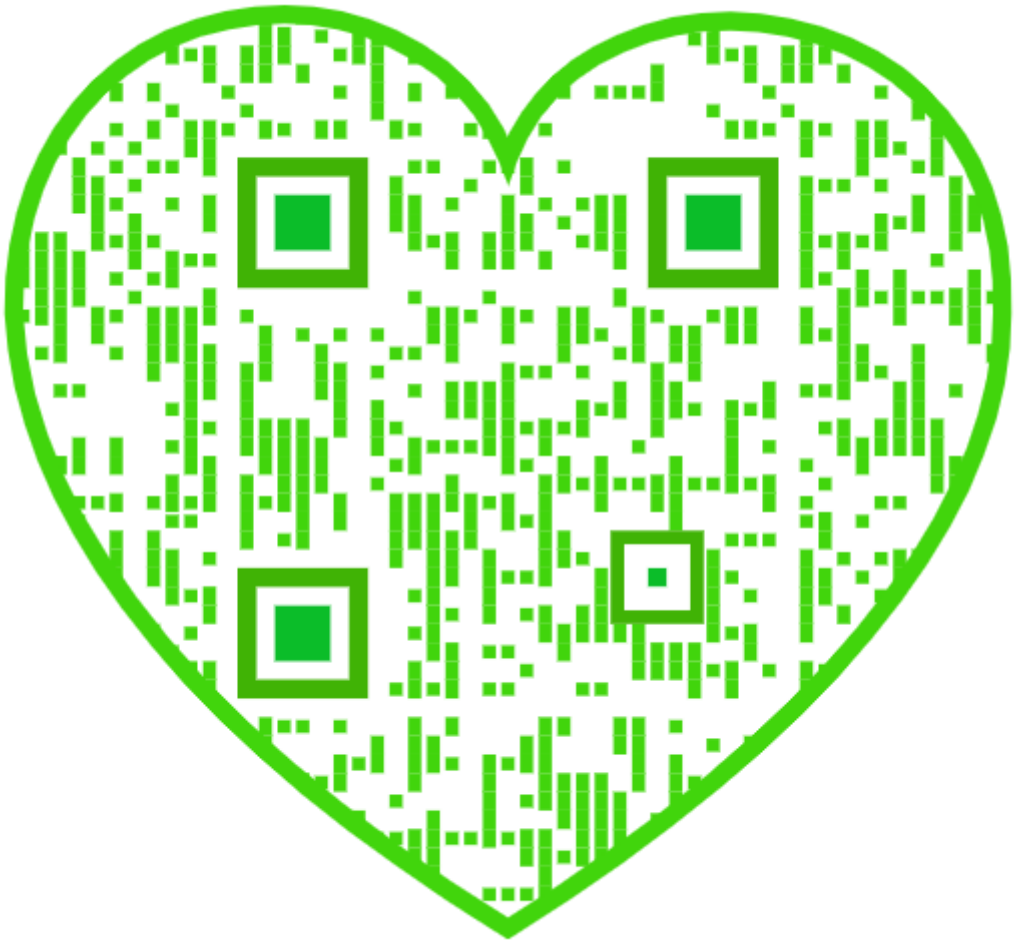
In principle, an atmospheric railroad consists of an exhausted tube or tunnel through which the car or carriage is forced by expansion of the air. The idea of employing air as a motive power in this manner is not new. Many years ago it was proposed, but owing to numerous difficulties arising from the unprepared state of the public mind, and from other causes, the project was not carried into effect. Later still, atmospheric railways were constructed in England. Of these there are two forms. In one the carriage runs in a tunnel the entire way from one station to another. At one end of this tunnel there is an engine which exhausts the air, and produces thereby the motion of the carriage. To make the carriage fit into the tunnel as closely as possible, there is attached to it a diaphragm made of india-rubber, with bristles appended. An example of this kind of railroad is exhibited in the Crystal Palace at Sydenham.

Another form is that in which the cars move in the open air, and are drawn by a piston passing into a tube which lies by the side of the track. This is the plan of the Dalkey and Kingstown railroad, near Dublin. It long since proved a failure, as owing to the arrangement of the valves in the tube, considerable leakage occurs.

On the former plan, Mr. Needham, an American, has improved. He arranges the tunnel in the form of an irregular ellipse, and placing in the circumference a powerful air-pump he exhausts the air from one arm, when that in the other arm rushing in, forces the car forward. It was shown how, by valves and a connecting pipe, the carriage might be stopped at any point without interrupting the action of the air.

To prove the necessity of this railroad as a means of locomotion in cities, the lecturer showed how desirable it was as a sanitary measure that hard workingmen should have the means of going out into the country after their day's work, without losing time by traveling in inconvenient street cars. By means of this railway they could pass from the Battery to the Central Park in about four minutes. In fact the rate of speed attainable without inconvenience was at least twice that of the English express trains, which run at the rate of sixty miles an hour. It would be also a matter of importance to the merchant and to the whole community, to whom time is of so much value. That something is nesessary to relieve the increasing transportation of New York and the suburbs, he considered evident from the fact that at least five hundred thousand parcels are daily carried in this and the adjacent cities.

As a means of collecting and delivering letters, he considered that the Pneumatic Dispatch possessed unusual advantages. It has been found to work well in London, where mail bags, etc., are drawn by it round curves and up and down hill, with great economy. It is proposed that the letters be droped into lamp-post boxes, from which they are automtically withdrawn by the pneumatic car in its passage. By an ingenious contrivance the letters may be dropped at certain places without stopping, and may be collected at all stations and lamp-posts below Forty-second street, and delivered at the post-office in six minutes.



Special Correspondence of the Scientific American.

MACHINE TOOLS IN THE EXPOSITION.

PARIS, May 14, 1867.

AMERICAN MACHINE TOOLS.

The display of machine tools for metal working in the Exhibition is large, and includes quite a number of considerable novelty of design. The Americans as is so frequently the case, are able to lay claim to the greatest amount of originality in what they have brought forward, but it is not always easy to assert that their designs are decided improvements on the usual British types of machines. Messrs. Wm. Sellers & Co. have much the largest number of tools among American firms, and their tools do no little credit to our native skill. They have not unnaturally endeavored to send tools of as unusual design as possible, and on that account they attract considerable attention. The largest tool exhibited by this firm is a planing machine in which the bed is stationary and the upright framing moves along over the work. The vertical sides at the sides of the frame are provided with tool heads as well as the cross frame, so that two and sometimes three faces may be planed at once. The belt is carried on two fixed pullies, and passes around the one which is attached to the frame of the machine on its way from one to the other. The position, therefore, of the movable pulley makes no difference in the length or tension of the belt. It is easy to see the facility which a stationary bed gives for bolting on fresh pieces of work while the machine is operating on another portion of the table, thus of course preventing delay in setting and removing the work, and no doubt this is a very important advantage. The economy of room that is secured is also equally evident, but there are few who will not involuntarily feel that a moving frame, even though as in this case furnished with a good length of base, cannot be as firm as one bolted fast to the foundations, especially when the tool is working near the top of the frame and therefore with a very considerable leverage, acting in any case on a much smaller base than that which the ordinary sliding table has, to resist jar. It may be questioned, therefore, whether the gain of time in setting work would not be overbalanced by the necessity for taking a comparatively light cut to avoid trembling. Another novelty is a planing machine of much smaller dimensions, in which the table is provided with a rack as if it were to be driven by a pinion, but instead of the latter, a coarse threaded screw inclined at the proper angle with the center line of the machine, according to the pitch, is substituted as the motor. The reader will observe that from the nature of the surfaces in contact there can only be a bearing at any one instant on a single line of the surface of either of the screw or rack, and whether the power of the parts to resist would be as great as where the rubbing is extended over a much greater surface, as in the case of the screw working in a nut, or as where little rubbing at all occurs, as with the rack and pinion, is a matter on which he can form his own opinion. The driving pulleys for this planer are so placed by means of bevel gearing as to bring the bed of the machine in the same direction relatively to the line shafting as the lathes, instead of at right angles to it, as in those of the ordinary construction. An example of his bolt-cutting machine is also exhibited, and the best praise that can be given to this machine is to notice how extensively it is used in England and how it has been copied by continental makers. A considerable number of Seller's patent self-adjusting injectors are also exhibited. One being cut open on one side so as to display the construction and mode of operation of the instrument. Mr Sellers also exhibits a gear-cutting machine, a self-acting steam hammer of small size, and other tools and portions of machinery, all of considerable merit. Messrs. Bement & Dougherty are also represented in the Exhibition. One of their tools is a fine horizontal boring machine, a tool well known I believe in America.

OTHER ENGLISH TOOLS.

The tools in the English department are models of solidity of design and excellence of workmanship. If there is any one branch of engineering in which the English particularly excel, it is in the construction of machine tools, and no one can walk through the machinery gallery of the Exhibition without being impressed with the superior judgment evidenced in the proportions of these tools compared with those by foreign makers. Messrs. Sharp, Stewart & Co., of Manchester, send a number of substantial tools, such as lathes, shaping machines and slotting drills, which show good design and careful workmanship. There is a good driving wheel lathe with two face plates and four tool posts, two on each side of the lathe, so that a double cut may be taken on the tires of both wheels at once. Their slotting drill differs from that made in America by Messrs. Bement & Dougherty and obtained by them from Mr. Shanks in Scotland, in that but one drill is used, and the work must therefore proceed more slowly. The tool is arranged quite differently from the other referred to, the drill in this case working vertically. Then there is that admirable tool so common in England, the radial drill. It saves an immense amount of time in drilling holes in large pieces of machinery, and has the additional advantage that it may be used for boring and work for which movable crabs such as are in use with us for similar purposes would be wholly inadequate. Why have not some of our tool makers brought it out in America?

WHITWORTH'S MACHINERY.

But if we wish to see perfection of design and execution we must pass on to the space allotted to Mr. Whitworth. Of course it is easy to praise what is already acknowledged to be of merit but the verdict in favor of these tools is unavoidable. It seems impossible to designate a single part as either too light or too heavy, a bearing as too large or too small, or a surface as too little or too carefully scraped. Every thing that is done shows mature consideration, and no labor is wasted on unimportant parts. Among the turning lathes which he exhibits is one without any spindle at all, the work being held between two ordinary centers and rotated by a driver placed near the middle of the length of the lathe. This is a revolving drum through which the work passes, the outer edge being provided with teeth for receiving the motion of the driving pinion. Two slide rests are used, one on each side of the driver. Another interesting tool is a special one designed for planing the faces of the hexagonal shot used in Mr. Whitworth's system of ordnance. Its construction is very similar to that of an ordinary planing machine, but the sliding table is replaced by a sliding spindle to which the shot is secured, and which has six spiral grooves cut in its surface, which give it a rotary motion as it moves forward through its bearings. Three tools are used, one above and one on each side of the upright frame, and the clutch—if so it may be called—by which the shot is held, is provided with notches properly distanced, so that the other faces may be brought properly under the action of the tools. A very simple planing machine with Whitworth's patent revolving tool holder, by which a cut is taken when the bed is in motion in either direction, is exhibited, and also a radial drill of the pattern turned out at these works. This is a simpler and more neatly designed tool than that by Messrs. Sharp, Stewart & Co., and is a beautiful specimen of work. The same may be said of a small foot lathe which stands beside it. In proportion as the surfaces become smaller we observe that the scraping is more carefully done, and this tool shows the highest degree of finish. The motion of the treadle, in accordance with the usual custom of these makers, is communicated to the crank shaft of the lathe by chain belts passing around pullies in the frame of the treadle. Three surface plates are also exhibited, and this may be considered the most suggestive part of the collection, as it is to this invention that Mr. Whitworth and the world owe the means to produce the accurate bearing surfaces now required in good tools.

But what can be said of tools such as we find in the Belgian department for example, where as a substitute for scraping, the makers have disfigured the bearings of their machines with fancy patterns such as diamonds and circles? If this must be done let it be somewhere else than on a working face. As we might expect, tools which exhibit such a barbarism as this also show throughout the very worst design and workmanship.

SLADE.

ON THE NATURE OF THE LATENT IMAGE IN PHOTOGRAPHY.

BY M. CAREY LEA.

When light, considered simply in reference to its illuminating power, falls upon any substance, we are accustomed to consider the effects of that illumination as passing away at the same instant of time that the illumination terminates. But there are a vast number of well-recognized exceptions to this rule, which we know under the names of *phosphorescence* and *fluorescence*.

If certain bodies, known as "phosphorescent," be exposed to a bright light, such as the direct rays of the sun, and then be removed to the dark, they will emit a very distinct light. This light continues to be emitted for a time of variable duration. With some substances it continues for days, with others it terminates in a few hours. Becquerel has enormously extended the number of substances that act in this way, by showing that the period of time during which they phosphoresce may be exceedingly short, and so escape ordinary observation. He constructed an extremely ingenious instrument by which phosphorescence could be made evident even when it continued for but a very minute fraction of a second after the light which fell upon the substance was removed. These facts, then, embraced under the general term of phosphorescence, prove incontestably that bodies may, by light, be thrown into a state of vibratory motion, lasting for a longer or shorter, sometimes a very considerable, time after the exciting cause is removed, and that, so long as this vibratory movement continues, they will themselves emit light.

But light, such as it comes to us from the sun, is endowed with another property distinct from illumination, and which we conveniently term *actinism*. *There is not the slightest reason to doubt that bodies may be endowed with the power of being impressed by these rays, and retaining them precisely as bodies may the illuminating rays.* Herein lies the explanation of the physical or latent image. It is simply a phosphorescence of actinic rays. Once stated, the whole matter is so evident as to carry conviction with the simple statement.

Let me then explain the manner in which this phenomenon takes place with iodide of silver. Pure iodide of silver undergoes no decomposition by light when thoroughly isolated from all substances, organic and inorganic, which are capable of aiding in effecting reduction. But, if exposed to light, it continues for a certain time thereafter to retain the vibrations it received; *and just for so long as these vibrations continue, will it be instantly decomposed if brought into contact with any substance which would have caused its decomposition had the two been subjected to the action of light together.*

Iodide of silver, if exposed to light in the presence of pyrogallic acid and nitrate of silver, is reduced. If the iodide be exposed separately, it is thrown into a state precisely similar to that of a phosphorescent body, except that it continues to vibrate in unison with the actinic, instead of the illuminating rays; and so long as this condition remains, if it be brought into contact with the above-mentioned substances, the effect is the same as if they had been exposed together to ordinary light.

For this property of light I propose the name of ACTINESCENCE, a name which, though not in every respect suitable, has the great merit of indicating the parallelism of the phenomenon to that of phosphorescence.

The more we examine these phenomena, the more we shall perceive that *actinescence must*, so to speak, exist. *For different phosphorescent bodies emit light of very different colors*, showing that their respective capacities of prolonged impression are confined to rays of a certain refrangibility differing for each in each case. Now we know that the actinic influence accompanies rays of a certain refrangibility, especially the violet, the indigo, and the rays immediately beyond the visible. The permanence, therefore, of these actinic rays under suitable circumstances, is no more difficult of conception than that of any other rays—and that this permanence exists for illuminating rays is a fact which has been known and recognized for centuries.

On what, then, does the faculty of receiving a latent developable impression depend?

On the possession by the body of two properties: First, that of being decomposed when brought into contact with certain agents in the presence of light. Second, that of being able to *retain the influence* of the chemical rays, so that on being brought into contact with these agents *after* removal from the light, the same decomposition may be brought about.

The first of these properties is *sensitiveness to light*.

The second is *actinescence*.

The joint possession of the two renders a body capable of receiving a latent or physical image.

It is easy to conceive that a body may be actinescent without being sensitive to light. In fact, substances that phosphoresce with a blue light are probably actinescent also, but not being sensitive to light, they of course can form no latent image.

To this class undoubtedly belong those substances which possess the property hitherto deemed so mysterious, that of storing up chemical power after exposure to light. When this fact was first published by Niepce de St. Victor it was received almost with ridicule. But in the views here explained, this remarkable fact finds its natural place so completely that its existence would even have been anticipated, had it not already been observed.

On the other hand, substances that are merely sensitive to light when brought into contact with others, but which have no power of retaining light impressions until the decomposing agent is brought into contact with them, are likewise incapable of receiving latent images. But these capacities may exist conjointly, as we see in the case of a large number of silver compounds.

This new view will, I think, dispel all the mystery that has seemed to some to envelop the idea of a physical image, and brings all the most obscure facts of photo-chemistry into parallelism with well-understood and very simple phenomena.—*Philadelphia Photographer.*

COOPER UNION SCHOOLS.

The annual reception and commencement of the male and female departments of this institution took place on the evenings of Wednesday, Thursday, and Friday of the last week in May. On each occasion the halls were filled with a fashionable and elegant assemblage, who manifested much interest in the progress of the arts and sciences. The young ladies of the School of Design displayed some fine portrait and landscape painting, as well as some excellent pen and ink sketches, and specimens of engraving on wood not easily excelled. In the male art department were exhibited some marked specimens of drawing in perspective and architecture from the fundamental principles to the most difficult problems, some fine specimens of drawing from copy, cast, and life, and in mechanical drawing from the embryo effort of the bisection of a line to the full and complete engine.

The receipts of the institute during the past year amounted to $37,178, showing a large increase over previous years. This fund is received from the rents of offices and stores in the building, and is the main support of the institution. The trustees declare the institute to be in an excellently prosperous condition.

The number of pupils that entered the schools last year was 1,700, and the number that remained to the close of the term 710. The full course of studies of the institution requires five years for completion, when if the pupil has passed a satisfactory examination each year, he is presented with the Cooper Union Medal and a diploma to that effect. There were eight graduates this year, one of them being a lady. The night schools are under the direction of Prof. Joseph G. Fox, whose bearing toward each individual pupil is ever courteous and gentlemanly. An occasional lecture on astronomy, which seems to have become a neglected science, would prove both beneficial and interesting to the pupils of this school, as well as create an interest in one of the most noble of the natural sciences.

The reading room during the past year was visited by 260,000 persons. The number of journals and magazines on hand is 260. The library is gradually increasing in size and value, and it is the intention of the trustees ere long to make it one of general circulation.

It must be indeed gratifying to Mr. Cooper to see so full and complete a realization of his early day-dream. Here along the corridors of the hall nightly throng the growing youth of this metropolis, seeking the fountains of useful lore which this good citizen has provided for them. Conscious of his own difficulties in his youth in acquiring a scientific education, he resolved that if he ever obtained the means, those who came after him should not suffer from the same cause, and erected this institution to that end. It now stands a grand and noble monument that will ever link his name with the cause of education.

SAFETY OF IRON SHIPS.

The Council of the Institution of Naval Architects (Eng.), has rendered an elaborate report prompted by the loss of several large and superior iron steamers during a year or two past, from which we extract the material conclusions and suggestions.

1. No general rule can be laid down for adjusting the proportions of length and depth to the breadth of a ship.

2. To every design of a ship should be appended the load water line, and her scale of displacement from light to load water line. Measures should be taken to secure that this information be recorded on the ship's papers, together with outline plans marked with the proper capacity of each compartment of the hold.

3. A minimum hight of freeboard (vertical distance from the load water line to the top of upper deck) should be fixed as follows: For a ship of 32 feet beam and 160 feet long, 4 feet; 192 feet long, 5 feet; 294 feet long, 6 feet; 256 feet long, 7 feet. In case of long ships, a complete spar deck would count for its hight as freeboard. No diminution of freeboard should be allowed for a poop or forecastle.

4. Compartments should be so arranged and proportioned that any two adjacent may be placed in free communication with the sea without sinking the ship; for the obvious reason that breakage may occur across the partitioning bulkhead, opening two adjacent compartments simultaneously. Transverse and longitudinal bulkheads, coal bunkers, iron lower decks, and screw alley, should all be so connected with the hull and with each other as to form independent water-tight compartments, communicating with the decks and each other by water-tight doors worked from the deck. Double bottoms are a great element of both safety and strength.

5. Sufficient ventilation should be provided in passenger ships, to admit of closing all side scuttles and hatches in bad weather. Openings in the deck should be fitted with solid coverings hinged in place so as to be readily closed. Side and stern windows should have hinged dead lights to be always in place. Combings over engine and boiler rooms should be as high as possible, of iron, and riveted to the beams and carlings. Beams should be continued across without interruption, or made replaceable on going to sea. Cargo ports should be strongly secured by iron bars. All communications with the sea from engine room and pipes should be protected with conical or Kingston or sluice valves.

6. Pumps:—a brass-barreled hand pump to every compartment, or patent pumps having connections to this extent, except the forward and after compartments—the former to have a sluice cock. Also a donkey engine and pump capable of pumping from the bilge and from the sea, of feeding the boilers, and of throwing water on deck; also one or more bilge pumps worked by the large engines, with bilge injection pipes if the engines have condensers. In large vessels the donkey engines should have a separate boiler high above the water line, and communication with the main boilers beside; and all vessels should have a set of bilge pipes connecting every hold and the engine compartments with these pumps.

7. As a security against fire, there should be force pumps on the upper deck, and sufficient length of hose, with the necessary copper delivery jets, to reach either extremity of the vessel, and also suction hose or pipes from the sea. The cocks by which the working of the pumps is regulated, should be carefully arranged and marked, and great care should be taken that both cocks and pipes are accessible. A plan of the whole should accompany the ship's papers, and the crew should be periodically exercised in the use of the fire apparatus.

8. Ships are often badly stowed, sometimes with the weights too low, causing them to roll with such rapid and violent motions as to carry away the spars and otherwise endanger the ship, and at other times too high, making the ship crank and liable to turn over. The stowage, whether done by contract or not, should always be done under the direction of the captain, and he alone should be held responsible. It is known that under given conditions of structure and stowage, the number of oscillations per minute will be about the same, whatever the force of the impulse which causes the ship to roll. But no such observations have been made in merchant ships as to warrant any specific rules on the subject, and it is highly desirable that the attention of captains and owners should be directed to the collection of information.

9. The pipes and valves of water closets on deck below or near the water line should be strong and carefully fitted, or they may be the means of gradually and imperceptibly flooding the ships. In regard to boats, anchors and cables, no fresh regulations are required.

10. In order to provide for the rapid clearance of water which may break over the ship, flapboards should be fitted to the lower part of the bulwarks, sufficient in number and area to permit the rapid escape of the water.

Some members of the council (builders) dissented strongly from the report. Suggestions from other members not voted into the report, were recorded as worthy of consideration, such as: that there should be two hawse pipes on each bow, and a second pair of riding bitts; that on the beam of each compartment there should be painted the whole tunnage of the vessel and the capacity of the particular compartment; that the dead weight and measurement tunnage in each compartment should be shown on the ship's register before clearance, and that no dead weight should be allowed on the fore or after sections of any passenger ship; that all communications with the sea should be exposed to view, and readily accessible by the engineers; that certain portions of the ship, as the screw alley, might be made accessible for repairs after they had been bilged, by forcing air into them and expelling the water, and that with this view they should be made air-tight and in communication with force pumps; that spars and boats should be so disposed as to float off in the event of a wreck, and form a substantial raft; and that deck houses and other portions of the ship may be so fitted as to be readily detached as rafts.

Mr. Scott Russell stated that it was of the first importance in the construction of iron ships to have no parts exceptionally strong and rigid, or exceptionally weak. The extra rigid parts would eat through and destroy the ship, and the thin places would yield. Perfect continuity and uniformity of strength, as near as it could possibly be calculated at every point, was his theory of iron ship building, in a word.

CAPTAIN FORBES ON SAFETY APPLIANCES.—To the above report we append a summary of suggestions made in a recent lecture by Captain R. B. Forbes, the well-known ship owner, navigator, and nautical inventor:—

Some method of shutting off steam which can be operated from the deck in case of fire about the boilers; fixtures to close openings and smother out fires with steam from the boilers; apparatus to blow off steam and water from the boilers upon the fire, close them air tight, and thus make them serviceable either to float the vessel or delay its sinkage; the tops of saloons and cabins to be made detachable to serve as rafts; doors to be hung on pintles and provided with cork panels, or otherwise made life preserving; outward and inward-bound vessels to pursue different tracks, lessening chances of collision; vessels to carry mortars, for throwing lines; small boats to be supplied with canvas drags, the mouth held open with a hoop; also with kegs of oil, which are claimed to have been tried and found very serviceable in severe storms; stools, mattresses, and other fixtures to be made life preserving, etc. Attention is called to the fact that not a single life boat is furnished to United States naval vessels, and few life preservers.

Cements and Uniting Bodies.

In the preparation of cements and all substances intended to produce close adhesion, whether in a semi-fluid or pasty state, freedom from dirt and grease, without slovenliness, is a most essential and necessary condition.

A TEMPORARY CEMENT, to fix optical glasses, stones, jewellery, etc., on stocks or handles for the purpose of painting, repairing, or ornamentiug, is made by melting together at a good heat, two ounces of resin, one drachm of wax, and two ounces of whitening; with this applied to the article when heated, secure fixation may be obtained, unfixed at pleasure by the same means, viz., heat.

RICE CEMENT, which is made by mixing rice flour intimately with cold water, and then gently boiling it, forms a beautifully white preparation, and dries nearly transparent; it is capable of bearing a very high polish, and is very durable; it is in every respect far before the common paste made with wheat flour or starch; it may be formed, also, into a plastic clay.

FOR UNITING STONE, DERBYSHIRE SPAR, ETC., ETC., melt together four ounces of resin and half an ounce of wax, and about an ounce of finely-sifted plaster of Paris. The articles to be joined should be well cleaned, and then made hot enough to melt the cement, and the pieces then pressed together very closely, so as to leave as little as possible of the composition between the joints. This is a general rule with all cements, as the thinner the stratum of cement interposed the firmer it will hold.

CEMENT FOR CHEMICAL GLASSES.—Mix equal parts of wheat flour, finely-powdered Venice glass, pulverized chalk, and a small quantity of brick-dust, finely ground; these ingredients, with a little scraped lint, are to be mixed and ground up with the white of eggs; it must then be spread upon pieces of fine linen cloth, and applied to the crack of the glasses, and allowed to get thoroughly dry before the glasses are put to the fire.

PUZZUOLANA CEMENT.—A kind of earth thrown out of volcanoes, of a rough, dusty, granular texture; its most important property consists in making a cement when mixed with one third of its weight of lime and water, which hardens very suddenly, and is more durable under water than any other. Manganese is found to be a valuable ingredient in water cements. Four parts of grey clay are to be mixed with six parts of the black oxide of manganese, and about ninety of good limestone, reduced to fine powder, the whole to be calcined to expel the carbonic acid; when well calcined and cooled, to be worked into the consistence of a stiff paste, with sixty parts of washed sand.

THE DIAMOND CEMENT for glass or china is nothing more than isinglass boiled in water to the consistency of cream, with a small portion of rectified spirit added. To be warmed when used.

LEAKY SKYLIGHTS may be stopped and cured with Dutch rushes, bedded in and covered with good white lead. On wet making its appearance it quickly attacks the rush, which swells up so tight and firm that all progress of wet and droppings is effectually stayed.

Lemery, the chemist, used the following lute for stopping retorts, etc.: Fine flour and fine lime, of each one ounce, potter's earth half an ounce; make a moist paste of these with white of egg, well beaten up with a little water, and this will be found to stop exceeding close.

Philosopher Boyle recommends, on experience, the following for the same purpose: Some good fine quicklime and scrapings of cheese, pounded in a mortar, with as much water as will bring the mixture to soft paste; then spread on a piece of linen rag, and apply it as occasion requires.

A most valuable glue for photographers, and extensively used by first-class bookbinders, is made from bottle india-rubber. This must be dissolved in highly rectified spirits of turpentine: the highly rectified spirit extracts every particle of grease, which is of the greatest consequence. As I have somewhere before remarked, it is not exactly what you do, but the way in which you do it; grease, above all things, is a most determined enemy to any of these preparations.—*Photographic News.*

THE SUEZ CANAL.

The prospects for a speedy completion of this great engineering work, from the latest accounts are not very flattering. The original plan contemplated the running of a canal 260 feet in surface width and twenty-six feet deep, connecting Port Said on the Mediterranean with Suez, at the head of the Red Sea, a course of about ninety-six miles. From recent and trustworthy reports it appears that the maritime canal has been partially excavated as far as Ismaileh, a distance of forty-eight miles or just one half the total length. Below this city operations may be said to have fairly commenced, but great engineering difficulties must needs be overcome before the task will be successfully completed. The proposed route passes through high drift sands which when once excavated, it would seem, must continue an endless source of trouble and expense, the action of the winds and the corrosion of the banks by passing vessels, demanding constant attention and repairs.

For the first nine miles north of Ismaileh the canal is only dug to half its future complete width. Beyond this, for the remaining distance to Port Said, there are two channels, each of one-third the complete width, the center portion being left so that traffic may be carried on in the one channel while work is progressing in the other. The average depth throughout is only seven feet.

To furnish supplies to the workmen employed, a fresh-water course has been opened from the river Nile at Cairo, which runs in a serpentine course passing by Ismaileh, thence in a line nearly parallel to the main canal to the port of Suez. A lock near the former city joins the two canals and by means of it a vessel of eighty tuns burden not long since safely made a passage between the Mediterranean and Red Sea.

At the works at Port Said steam barges are at work inside the harbor, carrying earth from the excavations out to sea in a north easterly direction where it is in no danger of its drifting back. One of the buildings in the gardens which surround the Exposition buildings is devoted to an interesting collection of models of these steam barges and dredges, also models illustrating the whole series of works on both canals, and the region of country through which they are to pass, plans of the principal places along the line of the canal El-Guisr, Suez, Ismaileh, and Port Said. The interest in this collection is further enhanced by a great variety of stuffed birds, insects and reptiles found in the vicinity of the canal, and fossil specimens and curiosities unearthed during the excavations. The whole is presided over by a large sized stuffed camel.

Although interested parties have persistently published the most encouraging prospects actually, the main Suez canal, after seven years of labor and millions of money have been spent upon it, is now but about one-third completed, and at the present rate of progress full five years must pass before it, as a commercial highway, begins to repay the funds which its protracted construction has absorbed.

How Mosaics are Made.

A traveler writing from the Continent, says the Mosaics seem to absorb the most time and money in the least space, unless it be the solid gold decorations. We saw a table last week less than six feet in diameter, said to have cost two hundred thousand dollars, requiring the labor of a large number of men for fifteen years. Upon entering the hall where this kind of work is done, I could not doubt these enormous figures. Suppose, for instance, a thousand of the hardest and most expensive stones which will take on a high polish, to be cut into pieces three-eights of an inch thick. These pieces are cut the other way into small pieces like shoe pegs, and where the shading from one color to another is sudden, these pegs must not be larger than a needle. Now the artist cuts and puts in these little pieces, selected according to their color, so as to give the coloring wanted as distinct as though painted. These pieces or pegs must be fitted so closely that lines of separation will not show, and set upon end side by side like types. They claim that ten thousand different shades of color are necessary; and in order to do this kind of work a man must be skilled in colors and shades as a painter, in order to place the colors properly, and then be the most careful and accurate of mechanics in order to fit the pieces, and then he must have patience enough to work on the cheapest and coarsest pictures one year, and upon a fine one, from ten to twenty years.

THE sixth enormous gun cast at the Fort Pitt Foundery for the Chilian Government, passed through this port a week or two since, accompanied by 100 balls of 1,000 lbs. each. The monster is twenty and a half feet long, twenty inches in the bore, and five and a half feet in diameter at the breech

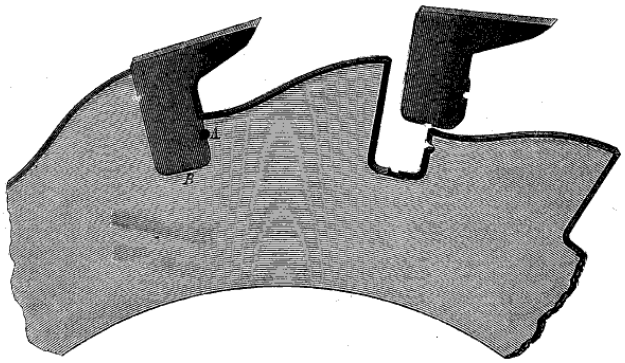
HOW TO GET THE BEST PAVEMENT.—It has been suggested that the Society for the Prevention of Cruelty to Animals could not do a better act of mercy than to offer a prize for the invention of a pavement best adapted for horses and not inferior to others in durabily and economy.

DR. CROSLEY, of Lowell, is putting up machinery for making coffin cases from surface slate instead of wood.

False Teeth for Saws.

The advantages of removable teeth for circular saws, especially over those cut from and forming part of the plate, are so apparent that they are not now generally denied by practical men. Inventors differ as to the best form of teeth and the best method of attaching them to the plate. We have lately published two plans, but the one herewith illustrated differs in some respects from those. It is the invention of N. W. Spaulding, one patent bearing the date Sept. 10, 1861, and a reissue April 21, 1863.

The form of teeth and method of inserting and holding is seen in the engraving of a section of a circular saw with two teeth, one in place, and the other detached. The bottom of the tooth has rounded corners in order that the strain on it may be distributed over a larger surface and prevent danger of fracturing the plate. Its edges have a recessed V-groove where they engage with the plate, while the edges of the recess in the plate are milled to fit the groove. A rivet at A, one-half the diameter in the tooth and the other half in the plate, holds the tooth securely in position. At the bottom is a slot, D, in which to insert a key to start the tooth when it is desired to remove it. False teeth with square corners tend to rupture the saw at their angles, and the rounding corners of this tooth are so formed for the purpose of remedying this difficulty. The result is that saws with this shaped tooth do not burst, but wear well under the severest treatment. The points are swedged to a chisel edge wider than the cross section of the body of the tooth.

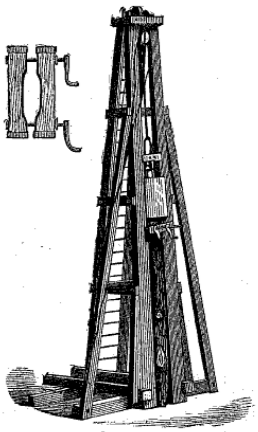


SPAULDING'S PATENT SAW TEETH.

For further particulars address N. W. Spaulding, 113 Pine street, San Francisco, Cal., or N. W. Spaulding & Brothers, 224 Washington street, Chicago, Ill., or Messrs. Branch, Crooks & Co., 116 and 118 Vine street, St. Louis, Mo. [See advertisement on another page of this paper.]

JOHN M'CLAY'S IMPROVED PILE DRIVING.

The engraving represents an improvement in the mode of driving piles. It will be readily understood by any one acquainted in the art. It consists of a yoke or clamp, constructed of either wood or iron, in such a way that it keeps the head of the pile immediately under the hammer until the driving is completed. When once adjusted the pile needs no further attention, whereas by the old method staples or bars were used requiring the close attention and hard work of four ormore men; it is composed of two pieces of oak or other strong timber six inches square banded with iron at the ends. In these recesses are hewn or cut, somewhat octagonal in form, to fill the pile timber. Through the timber pass headed rods of one inch and an eighth iron, with threads cut on them and a nut and wrench combined; these rods are at such a distance apart as to nearly touch the uprights or leaders of the driver, thus controlling any sideway motion of the pile. It is estimated that three-fourths of the usual time and labor of the old process is saved bythe use of this device. Another advantage claimed is that it serves to hold the fibers or grain of the head of the pile together, thus preventing the splitting or shiving which so often occurs.



Patented June 12, 1866. Further information can be had of the inventor, John McClay, or Jeremy W. Bliss, No. 240 Main street, Hartford, Conn.

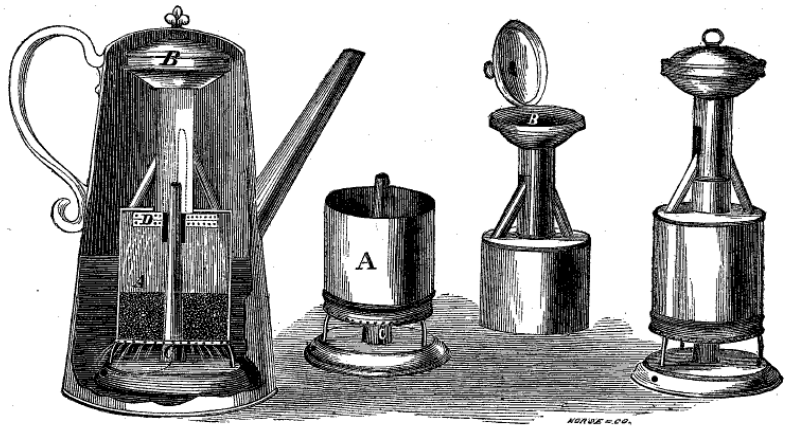
The Electrical Engraving Machine.

The inventor of this interesting apparatus, M. Gaiffe, who produced it in the London Exhibition in 1862, has since then developed it more perfectly, and now exhibits in the Paris Exposition a machine for simultaneously engraving any number of plates, of any scale orvariety of scales desired, from the same design, with an exactness of reproduction which has its equal only in electrotyping.

The machine, as described, looks like a face lathe, with any number of face plates parallel to the ways, and a slide rest carrying the graving tool at right angles to each of them. The rotation of all the face plates is exactly uniform, and the horizontal movement of the rests across the face of the plates from the center to the circumference, and extremely slow, is conveyed by one continuous screw, of the same pitch throughout, if engravings of the same size are desired, or if otherwise, the pitch is varied so as to cause the slide rest to move more slowly in proportion to the reduction of scale desired. The face plates slowly revolve, and the graving tools, starting at the centers of the face plates and progressing imperceptibly toward the circumferences, traverse the whole disk with a spiral line, closer or more open according to the pitch of screw and consequent rate of motion. The first face plate carries a copper plate on which the design is formed, preferably on an enlarged scale, in non-conductive varnish. The tool applied to this plate is simply a conductor with a platinum point, by which the currents transmitted through the exposed portions of the plate, or lights of the design, are passed on to all the other rests in the machine. Each of these carries a graving tool with a diamond point, pressed by a spring against the plate to be engraved, as it revolves upon the face plate. A pair of electro-magnets behind each graver retract it from the plate at each passage of electricity through the lights of the design, letting it fly back and strike the plate as the electricity is intercepted by the shades. The whole design is thus passed over spirally from the center and a *fac simile* of prescribed scale is engraved by each of the tools. Magnified by a strong lens the spiral dotted line which constitutes the engraving is traceable, and hence a bank note engraved by this machine could not be successfully imitated by any other means. Large maps, etc., have been reduced to minute proportions, and found as legible when magnified as the originals.

Improved Apparatus for Coffee, Tea, etc.

The engravings show views of the different parts of a contrivance for extracting the essential principles of coffee, tea cocoa, etc., without injury to the flavor or loss of the aroma.



WOODWARD'S COFFEE AND TEA EXTRACTOR.

A, represents the receptacle for the ground coffee, tea or cocoa. B is the cover, extension tube and top, which is placed, charged with the coffee, in the pot. The tube may be depressed or elevated to accommodate itself to the coffee pot or other vessel and is held down by the lid. Boiling water is poured through the tube into the receiver. In the center of the receiver is an upright tube, perforated at the top, which conducts the boiling water up through the receiver to fall back through the strainer, D, from whence it continually percolates through the coffee to be again returned. Thus all the virtue of the coffee is extracted and none of the aroma is lost. The bottom of the receptacle is circumferentially perforated, forming a strainer through which the liquid passes while the grounds are retained.

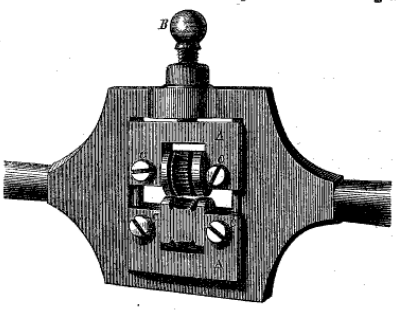
Its advantages are so apparent that further description is needless. It appears to be admirably adapted to its purpose. Samples can be obtained or further information received by application to J. Pickering, 17 Cortlandt street., New York city.

The Microscopic Fleet.

The current of blood, and its channels in the body, is the great canal by which the subtile life-supporter, oxygen, is carried along. It constitutes the means of communication between the interior of the body and the atmosphere, and serves for import as well as export. The blood corpuscles, which are continually rushing about in the stream, constitutes tne exact analogue of a fleet of vessels laden with oxygen, and carrying the cargo to the most distant part of the system and all the different organs, where part of it is consumed for works going on there, while another part is stored up and accumulated for future use. The carbonic acid is the return load put on these little vessels, each of which are only visible under the microscope. In spite of their tiny form, they are able to transport forward and backwark four pounds and a half of oxygen and carbonic acid per day, to condence within themselves four hundred liters of oxygen from the atmosphere, and to give off as much carbonic acid, without any of their speedy and airy movements being discerned by the observer. During the day they export much more carbon than they import oxygen, and during the night, in quitude and sleep, they follow each other with rich cargoes of oxygen to provide for the expenditure of the next day.—*Dr. Brown.*

GILL'S SCREW-CUTTING DIES.

When the ordinary dies in screw plates or bolt cutters become dull there is no remedy but to anneal, recut, and reharden them. The improvement represented in the engraving is to form dies so that when the portion in use becomes dull another unworn portion of the die can be presented to the bolt without removing and repairing the dies.



The device is to make circular dies, pivoted into sliding blocks, to be forced into position by a screw in the ordinary way, the dies being capable of being rotated at will. The engraving shows the face of a screw plate in which are the blocks, A, which are forced together by the screw, B. These blocks hold each a die of nearly cylindrical form which may be rotated by slacking the set screws, C, and held by screwing them up, the screws bearing upon their journals or pivots. One side of each die is planed or filed flat, so that when the flat side of each is in position a screw can be threaded up to the head. Where the bolt is long, and to be threaded only a portion of its length, the convex surface of the dies can be used. When one portion is dull the dies may be partially rotated to present a new cutting surface, These dies can be secured in a head for use in a bolt-cutting machine as well as ih an ordinary screw plate. Henry Gill, of Mansfield, Ohio, is the inventor, a patent for the contrivtnce now being solicited through the Scientific American Patent Agency. For other particulars address as above.

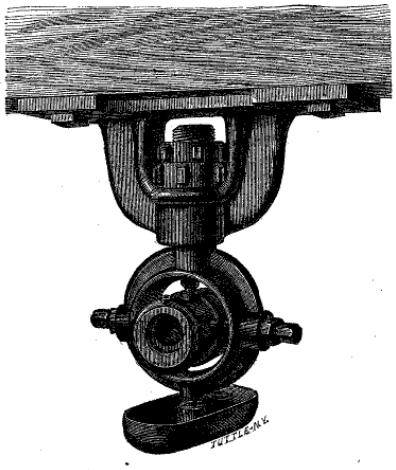
WARD'S CLOTHES PIN.—This device, illustrated in No. 21 current Vol., page 358, is susceptible of a greater number of adaptations than therein mentioned. By turning one of the pieces half way around it gives two different sized notches to grasp the line and clothes, so as to be adapted to large or small lines or thick or thin clothes, while if the notches on both the pieces are brought together another sized line can be accommodated.

MINING.—The renowned Fremont estate, Mariposa, has for me time been lying perfectly idle. Not a mine on the grant is being worked, the shafts are filled with water, the machinery rusted, and everything apparently in rapid decay in consequence of the operations of the late Superintendent. The present overseer is engaged in straightening up affairs and will get the mills in operation at the earliest period.

DAVIDSON'S SELF ADJUSTABLE HANGER.

The work of hanging shafting with the old style of hangers is a laborious and vexatious task. It is difficult, after having got the boxes in perfect horizontal line, to level them so the shaft shall not strain nor spring. After the hangers are in place, one here must be raised and another there must be lowered by slacking and setting up bolts, "shimming" under the feet, or paring away the beams. But with such a hanger as that seen in the engraving all this annoying labor and consumption of time is avoided. After the line is drawn on the flooring timbers, a single hole is bored for each hanger, to receive a central projection on the face of the cross piece, and then the bolt holes are bored through. The hangers are then secured firmly by the bolts, no alteration of their positions being required if the center hole is bored correctly. For leveling, nothing more is necessary than to raise or lower the frame sustaining the box, by means of the nut and check-nut seated in the space between the two legs, which form the saddle. This can be done in a very few minutes and with very little exertion. It will be seen that the frame carrying the box is allowed to turn in a horizontal plane, while the method of swinging the box by the two screw pivots through the sides of the frame allows motion to that in a vertical plane, so that the shaft readily adjusts itself.

The box has a reservoir which holds sufficient oil, as guaranteed by the manufacturers, to run six months without re-oiling, and has been thus run eighteen months on a two-inch shaft making one hundred and fifty revolutions per minute.



Passages under the lining of the box connect a reservoir at each end, and in the center is a diagonal slot filled with felt or sponge which keeps the shaft always lubricated. A dripper is attached only to receive the oil which may run over in filling if more is poured in than enough to fill the box.

The manufacturers furnish a peculiar coupling to accompany this hanger, although it may be used with any coupling. This one, however, is a cylinder having a hole tapering from each end to the center—the ends of the sections of shafting being turned to fit and held by steel pins passing through coupling and shaft. A slot through the center of the coupling allows the introduction of a wedge to start the ends of the shaft, which do not fully meet, when a section is to be taken down to put on or take off a pulley, one of the pins in this case to be driven out.

This hanger and box was patented Sept. 7, 1858, and many hundreds of lines of shafting are running in it, giving in all cases perfect satisfaction. It saves all the oil, can be adjusted without stopping the engine, and is arranged for post bearings as well as for hangers.

It is furnished by Messrs. M. T. Davidson and Co., 84 John street, New York city, who will give any additional information desired. See advertisement on another page.

Pneumatic Railways in Switzerland.

M. C. Bergeron, Director of the Western Swiss Railways, has obtained a concession from the Canton de Vaud to connect the railway station and the Place St. François, at Lausanne, Switzerland, by means of a Pneumatic Railway.

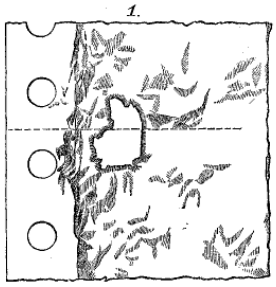
The same engineer has lately presented to the British Association at Nottingham the plans for a Pneumatic Railroad over the Alps, by the Simplon Pass, commencing in the Saltine valley on the Swiss side, and the Diveria valley on the Italian side. The distance is 16 miles. M. Bergeron estimates the total expense at $4,000,000. The incline on the Italian side would be 1 in 14. On the Swiss side 1 in 6½. He proposes a tube large enough to receive carriages of the size of an ordinary omnibus. The highest point to be reached is 6,000 feet above the level of the sea. The tube is to be cut in the form of a gallery in the side of the precipices, the debris being allowed to fall into the torrent below. The air current is to be produced by means of water wheels for which the streams furnish abundant power. This is by far the cheapest plan yet presented for effecting the passage of the Alps by railroad. Its economy is principally due to the small area of the proposed tunnel. The working expenses would be very light.

THE cost and expenses of the Erie Canal to Sept. 30, 1862, amounted to $52,591,101 81: tolls received, $59,264,810 62: clear direct profit to the state treasury, $6,773,864 81.

STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

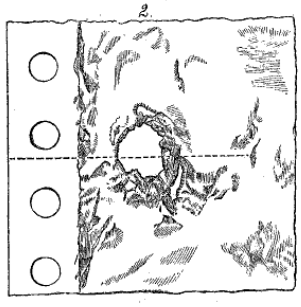
NUMBER SEVEN.

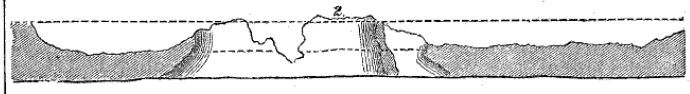
Probably no structure used in the mechanic arts is subject to greater and more rapid deterioration than the steam boiler. Beside the ordinary wear and tear to which everything beside is subject, it has insidious enemies which often give no present evidence of their depredations. Of these, corrosion



is one of the worst. If internal, its progress can only be ascertained by occasional inspection, and its ravages generally defy all remedies. If external, it is hardly more readily discovered, especially if the boiler is lagged, cased, or otherwise covered. And in either case corrosion is an injury the effects of which cannot be remedied by repairs.

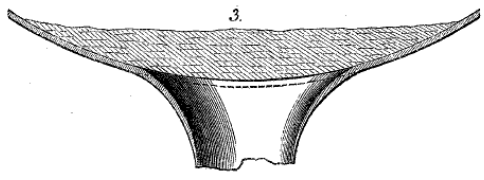
Nos. 1 and 2 with the corresponding sections show the effects of external corrosion. That in No. 1 was occasioned by covering the boiler with ashes, a common practice to prevent the loss of heat by radiation. The attraction of moisture by the ashes and the corrosive matter thus dissolved from its substance thinned the tops of the boilers in less than two





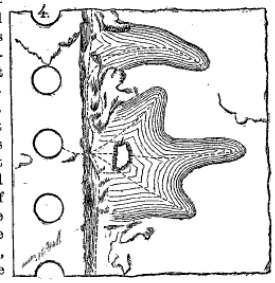
years until, as seen in the section taken across the plan on the dotted line, a hole was made entirely through the plate. This work went on under the ashes undiscovered until the boiler was rendered unfit for service. Nos. 2 present a similar case only that the corrosion occured under a covering of sand after eight years working. It will be seen that the result is similar in each case.

Accumulations of scurf afford excellent opportunities for the development of corrosion inside the boiler. If not frequently removed the scurf forms a coating beneath which the work of destruction goes rapidly on. In a horizontal cylindrical boiler, the scurf is deposited to a dangerous thickness on the bottom, allowing the plate under it to become overheated and softened, when the scurf sinks down into a pocket which if unnoticed will soon become so weakened by corro-



sion as to burn quite through. One of these pockets is shown in No. 3. In this case the sediment had filled the bottom of the boiler to the depth of three inches at the lowest part, and by heating, the plate was bent down into a gradual curve, and thinned from half an inch to about one sixteenth of an inch

Leakage of rivets and seams is a prolific cause of local corrosion. When boilers are emptied on Saturday night, directly after working, and before the brick work has had time to cool, they expand by the heat remaining in the masonry, and the boiler becomes in some parts hotter than when it contains water, and rivets are sprung by the expansion. Sometimes this expansion is intentional for the purpose of loosening the scale. When the boiler is again filled and set to work the seams and rivets leak, causing the corrosion that is called "channeling." Nos. 4 show a specimen of this sort of corrosion. In this case the central rivet on the plan leaked and cut a series of channels into the plate along the course of the dotted lines, producing a hole through the plate.

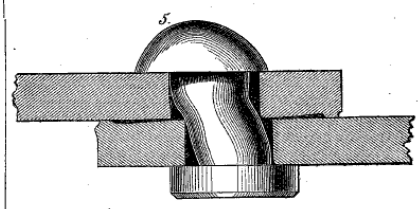


This corrosion had been going on for about four years. Many explosions occur from this cause.

Faults in construction will ruin a boiler made of the very best material. No. 5 shows an instance of bungling workmanship in riveting and calking. An examination of this

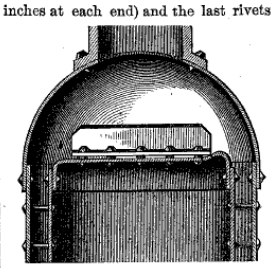
specimen is sufficient without explanation to enable any one to understand what it represents. Another instance of improper construction is given in the following from Mr. Thomas Hoge of Waynesburg, Pa. He says: "I send you a

sketch of a portable boiler which I bought at sheriff's sale at an oil well last fall, and which though it did not "explode," the crown sheet, or plate over the fire, gave way and cracked enough in places to let the water blow through and put out the fire, and was damaged beyond repair except by taking



out the whole sheet and putting in a new one and staying it as the first should have been secured.

The sketch shows a cross section of the boiler through the fire box. The crown sheet was flat and about 28 by 48 inches and stayed with crown bars of angle iron as shown, with washers between the bars and sheet, about ¼ of an inch thick. The bars were not as long as the width of the fire box by four to five inches (more than two inches at each end) and the last rivets still further from the edge by 1 to 1¼ inches, making 3 to 4 inches from the rivet to the flanged corner of the plate. The crown bars should have reached clear over the crown sheet and have been bent down so as to rest upon the edge of the side sheet where it would have had a permanent support for the immense weight to be sustained; but instead of this they had no support at all beyond the last washers, though they projected a little over them, consequently all that part of the sheet riveted to the bars was very rigid and on being raised or depressed all the strain would come at the last rivet in each bar, and the sheet having no support from there to the riveted edge at the side sheet, would be easily bent down or "kinked" at the right hand as shown in the sketch. I had plenty of water and 90 pounds of steam when the plate at one side bent down and was fractured as shown; and most probably would have been torn clear out but the ends of the crown bars beyond the washers came down until they rested upon the sheet at the extreme end, thus supporting the weight about an inch nearer the edge of the sheet, where it had support by the line of rivets and where it was capable of sustaining a much greater weight than further in at the washer. A little figuring will show that there was over 120,000 pounds of pressure on this sheet when it gave way, or over 8,000 pounds on each outside washer at about 3 inches from the



flanged corner. Is it any wonder that a quarter inch sheet was bent under such a load? I got a good blacksmith to assist me and we took the old sheet out in less than a day; then I took it to a boiler yard 50 miles off and got a new sheet and crown bars made and we put it in ourselves without any assistance from machinist or boiler maker, and at an expense of not over $200, while if I had taken it to a machine shop, as all said I must do, and pay $5 to $6 per day it would have cost me $500 to $600 before I got it back to it s place again. Not that I depreciate the services of good machinists or the advantage of machinery, but if a man has the ability to do his own repairing I like to see him exercise it, but if he has not the ability, or cannot see his way clear he had better not commence it. I have had 122 pounds of steam on my boiler since we repaired it, without any sign of weakness. Finally I would advise every man who intends to purchase a boiler especially an "oil engine" made by an unknown party, to examine it thoroughly and not conclude from external appearance, as I did, that it is all right within, where it is not easy to see; and if manufacturers continue to make such defective engines as the above, just let them keep them. They know, or ought to be made to know by a law or loss of business, that such gross malformations will not be tolerated."

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Why the Commissioner does not Increase his Force.

MESSRS EDITORS:—I find in the last number of your wide-spread and useful journal an article censuring the Commissioner of Patents, written without proper investigation, and inspired no doubt by your zeal for the rights and benefits of inventors who look to you for information on subjects connected with their interests as such.

Let me refer you to the Commissioner's report, published in your 12th number, under date of 23d of March last. He says there, in brief, that the clerical and examining force cannot be augmented without providing more room, as every room is at present filled far beyond its utmost capacity, and the serious obstacles to business cannot be remedied in any other way than by furnishing additional rooms.

In every part of the report we have it stated over and again the *want of room*, and it is that, and that alone, which is the barrier that opposes the "progressiveness of the department."

Congress, it is true, has given the examining force required; and it is also true it has turned a deaf ear to that part of the Commissioner's report where he calls upon it "in the confident hope that your honorable body will take measures to afford the relief so much needed," *i. e.*, "the indispensable necessity for much more room in order to properly carry on the now great and rapidly increasing business of the Office."

In the same number that gives his report we find an editorial headed "The Rights and Wrongs of the Patent Office," after eulogizing the Commissoner's "pathetic facts," and "unadorned statement," you wish he "had taken the opportunity to urge the just complaint of the inventors more at large," etc.

In the face of this just and strong statement in your editorial, and a daily knowledge of the Office's condition, it is fairly presumed, you turn round and throw the entire *onus* of the "inactive measures" on the Commissioner, knowing as you must, as a matter of necessity, from your extensive business with the Office, that Congress is *solely* to blame in not providing room for the patent business which sustains "the magnificent building," and for which it was solely designed.

The Indian Bureau, and Agricultural, and Land Office, and Pension Office, have no right to hold rooms in it to the exclusion of the Patent Office, which seems to be regarded as on sufferance, the same as the cuckoo regards the robin even in its own nest.

The Commissioner is doing the best he can to crush together or conglomerate the examiners to make room for more, and as soon as he has got a perch or two ready in some small out-of-the-way cage of a room graciously granted him in any corner, he will bring the birds into the cage, and there, under difficulties, do what he can for inventors, and patiently await the tardy action of Congress. A SUBSCRIBER.

Washington, D. C.

Caterpillars---Care of Trees---Objections to Metal Lamps.

MESSRS. EDITORS:—In No. 22, current volume, on page 346 I notice a letter from a correspondent headed "Kerosene and Caterpillars." I protest against the gentleman's suggestions; the practice of boring holes into the hearts of trees is as deadly to them as a bullet hole through the heart of an animal. The introduction of milk by injection into the veins of man is said to cause death; what then is likely to follow the mixture with the sap of a tree of mineral oil, tainted with impurities and corrosive chemical matter. Kerosene has been found to contain sulphuric and hydro-fluoric acids, etc. Are these substances proper dilutants for the sap of trees even in minute quantities? Introduce a chip of wood into either of the above acids, note the effect, and consider.

As to sulphur, I do not believe that a tree has ever been damaged by it; in fact, I do not believe that a single grain of the mass corked up in the tree was ever taken up in solution by the sap and circulated. A fine row of ancient elms before a public edifice in this city began to die—real cause, defective and improper trimming, supposed cause, "caterpillars," etc. Holes were bored into the hearts of the trees and roll sulphur introduced. In a short while the trees were all dead. When they were cut down the sulphur was found unchanged. Those trees died of improper trimming and the boring of the aforesaid holes, and here allow me to say a few words on the training of trees. Elm trees require peculiar care A branch growing in the wrong place should never be suffered to become a large branch It should be immediately cut off. The amputation of a large limb is almost certain to be the death of the tree; even when the stump is protected it soon begins to decay, and though to a superficial observer it might seem perfectly sound, a single thrust directed by a skilled hand would penetrate the deceitful crust and lay open the mass of decay within. From that stem the poison of decay slowly crawls. Its progress cannot be discerned by the outward appearance of the tree, but it reaches the heart of the tree and destroys it: soon the leaves begin to wither and the tree dies.

There is another subject to which I desire to call your attention. I recently observed an article in your paper recommending the adoption of brass or metal resevoirs instead of glass for the oil in kerosene lamps, as less liable to burst. Now, brass is a much better conductor of heat than glass. Did you ever attempt to raise or lower the wick of a lamp which has been burning some time? If so, you must have remarked the heat of the brass handle; that heat is not confined to the handle. It will be found on examination that all the metallic portions of the lamp are equally hot. Suppose the oil contained within such a medium. How long would it be before the amount of gas evolved would be sufficient to burst the strongest metal lamp? A metallic lamp, burning kerosene, resembles a powder magazine with burning fuse attached. F. R.

Albany, N. Y.

What Twenty-five Cents Will Purchase.

In these days of high prices our readers will no doubt be surprised to hear of an article that is not only really cheap, but actually valuable. We allude to the new edition, just published, of our book "For Inventors and Mechanics." For 25 cents the purchaser obtains a neat little bound volume of 108 pages, elegantly printed, containing among many other things the following:—

The complete Census of the United States by counties, including a table of the population of the principal cities and towns; The complete Patent Laws of the United States; Forms for Assignments and Licenses; Official rules for proceedings at the Patent Office; 140 diagrams of Mechanical movements, with descriptions; The modern condensing steam engine, with engraving and nomenclature of the various parts; Diagrams of the rotary steam engine; Substitutes for the crank; Outlines of practical geometry; How to calculate the horse-power of engines, water, and water wheels; How to sell patents; How to obtain patents, home and foreign; Table of steam pressure; Table of heat conductors; Information upon assignments, reissues, extensions, interferences, infringements, etc., together with a large amount of other valuable illustrated matter,

Published by Munn & Co., 37 Park Row. Price only 25 cents. Sent everywhere by mail on receipt of the price. Also to be had of the leading news agents.

An intelligent and appreciative correspondent, in a recent letter, thus speaks of the above publication:—

"I think there was never before printed or published so great an amount of knowledge in so small a book."

We think so too, and we advise everybody to supply themselves with a copy while they are to be had.

Locked Safety Valves.

The following circular respecting the locked safety valve has been issued:—

TREASURY DEPARTMENT, Saturday, June 1, 1867.

In order to remove all cause of complaint and secure uniformity among the several Inspection Districts in respect to locked safety valves, the commission convened by order of the Department to examine and report upon the life saving inventions, have examined such safety valves as were brought to their notice, and have approved the five hereinafter specified as meeting in the highest degree yet attained the requirements of the law. The results attained by the commission in this direction have been submitted to the Board of Supervising Inspectors convened in special session in Washington, and by it unanimously approved by a majority of the members of the board being present. At their request the Department now announces that henceforth any one of the valves herein specified may be used in any inspection district at the option of the steamboat owners, subject, of course, to the usual inspection and tests applied by the local inspectors, and to examination and approval, or disapproval, for special reasons, by the supervising inspectors. It is to be distinctly understood that these valves, though in their general character approved, are yet to be subjected to the most careful and exact scrutiny as to the quality of material and workmanship; and their sufficiency in each particular case to meet the demands of the law. It is also to be understood that this enumeration is by no means designed to exclude other valves, equally meritorious, that may be presented, but that supervising inspectors are required to afford to all such a thorough and impartial examination, and accept any that are found to possess merit equal to those now selected. The valves which have been chosen are: First, the American high and low pressure: second, the Robinson high and low pressure; third, the Farrar high and low pressure; fourth, the Mason high and low pressure; fifth, the McMurchy.

HUGH MCCULLOCH, Secretary of the Treasury.

New Steamers.

The Pacific Mail Steamship Company has just completed, in this city, another large and magnificent ocean steamer named *Celestial Empire*. She has one American beam engine of 105 inches diameter and 12-feet stroke; wheels 40 feet diameter and 12 feet face, with a bucket width of 24 inches. She has surface condenser arranged as part of the engine, fitted with brass tubes ⅝ inch diameter and 9 feet long, with the joints made with "Allen's compressed wood-packing," and the condensing water thrown through the tubes by means of an Andrew's rotary pump, driven by a pair of inverted direct acting engines, geared two and a half to one. Connecting with the suction of this pump are valves communicating with the bilge of the ship, so that in case of leakage, the whole capacity of the pump can, in a few moments, be used to free the ship, amounting to over 20,000 gallons per minute. Steam is supplied to the engine by four horizontal tubular boilers, placed forward of the engine in the hold of the ship, arranged with the fire-room fore and aft, and the uptakes connecting to one smoke-pipe of 10 feet diameter. The tubes are 3 inches diameter by 7 feet long. Steam chimney 20 feet high, which gives great freedom from priming even in the heaviest of weather. The boilers contain 24 furnaces, with a total of 585 square feet grate surface, and 16,700 square feet of fire surface, which gives, with great ease, a working pressure of 20 pounds for the engine. In connection with the main engine and boilers, the engineer department is furnished with two donkey steam pumps of large capacity, and arranged to pump from the bilge, or to feed the boiler, or throw water on the different decks in case of fire. They are supplied with steam from an independent boiler, so as to be worked when steam is not on the main boilers. There is also supplied a hoisting engine, for delivering and receiving cargo, and coaling the ship by steam, in fact, everything that would add to the efficiency of the engineer department has been supplied.

The *Celestial Empire* is the second largest vessel ever laid down in the United States. The first one of the same class was the *Great Republic*, being a sister ship, belonging also to the Pacific Mail Company. The latter, it will be remembered sailed a few weeks since from this port to take her place on the newly established line of the Company, to ply between San Francisco and China *via* Japan. In many respects these two vessels are nearly alike. They are the largest vessels in the world, next to the *Great Eastern*, devoted to the passenger trade, and reflect the highest credit upon our naval architects, shipbuilders and machinists. Those of the Cunard line, and even those of the celebrated French line, look like fourth rate steamships alongside of this modern ark of the Pacific Mail Company.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

APPARATUS FOR MAKING VINEGAR.—Wendelin Weis, St. Paul, Minn.—This invention consists in so constructing an apparatus for making vinegar that the vinegar can be made in a very short time and with the aid of but one set of shelves, and that the shelves can be easily and quickly cleaned.

PESSARY.—E. T. Hofmann, Poughkeepsie, N. Y.—This invention relates to a pessary which contracts downward all round and fits the entire neck of the uterus, anterior, posterior, and lateral, as far up as said uterus extends into the vagina, the posterior surface of the pessary being made to fit the convexity of the sacral vertebræ and its anterior surface to the neck of the bladder, so as to give to these parts protection from pressure. A depression on the upper surface makes room for the cul de sac, and flat inclined surfaces on the sides keep the pessary in position and prevent any undue lateral motion of the same.

STEAM BOILER.—William Lowe, Bridgeport, Conn.—The object of this invention is to improve what is known as the horizontal tubular or flue boiler, and it consists principally in forming a combustion chamber within the shell of the boiler, directly over the fire.

NUT MACHINE.—James Haslam, Philadelphia, Pa.—This invention consists in arranging a catch upon the end of the vertical slide bar, which by the old process, holds the nut while it is being squared, whereby the nut is caught and held in position.

BOLT AND RIVET TRIMMER.—M. D. Budd, Roscoe, Ill.—This invention consists in constructing a tool for cutting or trimming bolts and rivets in blacksmith work and other iron or metallic work.

EQUILIBRIUM STEAM VALVE.—R. F. Brown, Savannah, Ga.—This invention consists in forming the valve with apertures for the admission and exhaust of the steam, in such a manner that the steam presses equally or nearly so upon each side of the valve.

GRATE.—William Kelser, Stroudsburg, Pa.—This invention consists in making the grate in two parts, and operating each part from the outside of the stove.

STEAM AND WATER-HEATING APPARATUS.—Alanson Cary, New York City.—The object of this invention is to provide a safe, efficient, and economical apparatus for the warming of private houses and public buildings of every description by heated air, and the invention consists in placing in a suitable apartment a succession of hollow plates, so constructed as to be steam and water tight, which plates are connected together and also connected with a steam boiler by suitable pipes. Also in an arrangement of tubes through the said plates, whereby it greatly increases the heat-radiating surfaces.

EVAPORATOR.—Henry Lighty, Attica, Ind.—This invention has for its object to furnish an improved evaporator, so constructed and arranged as to greatly diminish the labor attending the evaporation of the juice, and at the same time to separate both the scum and sediment from the sirup, and to guard against scorching and burning.

GATE.—B. Homer Fairchild and Emery Sadler, Farmington, Mich.—This invention consists in forming the gate with the forward end or ends of the upper or upper and lower horizontal bars extending out in front of the forward vertical bar, so that the gate may be partially opened and secured in place to allow the passage of small stock while larger animals are prevented from passing.

AXLES FOR WAGONS, CARTS, ETC.—F. McManus, Ellenburg Centre, N. Y.—This invention consists in winding a wooden axle with wire, to prevent it from wear.

POTATO DIGGER.—J. C. Richardson, Benton, Me.—This invention has for its object to furnish an improved machine by means of which potatoes may be dug rapidly and thoroughly.

CAR COUPLING.—John B. Behrens, Pearl, Ill.—This invention has for its object to furnish an improved car coupling, so constructed and arranged that in case of accident to any car or cars of the train, the injured cars shall uncouple themselves from the others, so as not to drag all the cars with them to destruction.

PRESS OR COVER FOR TUBS, BARRELS, ETC.—Hiram L. Chase, Bath, Me.—This invention has for its object to furnish a simple, convenient, and effective means for keeping salted meat, pickled fish, or any other articles under the pickle or brine to preserve them.

MACHINE FOR DESTROYING POTATO BUGS.—Henry Pitchforth and Wm Benson, Muscatine, Iowa.—This invention has for its object to furnish an improved machine, by means of which the bugs may be conveniently whipped from potato vines, and destroyed.

WROUGHT-IRON PLOW BEAMS.—Waldon Eddy, Greenwich, N. Y.—This invention has for its object to improve the construction of wrought-iron plow beams, so as to make them easier of manufacture and more efficient in operation.

POST AUGER.—Thomas Leeson, Sharon, Wis.—This invention has for its object to furnish an improved auger for boring post holes, simple in construction and effective in operation.

HAT-SIZING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.—This invention relates to a new and improved machine for sizing hats, reducing their dimensions by rubbing and friction, after being formed in the usual way. The invention consists of two endless aprons placed vertically in a suitable framing, and one arranged to travel or move a trifle faster than the other, and both so arranged as to have a reciprocating motion, whereby the desired work may be effectively and perfectly performed.

SIFTER.—R. C. Ludlow, St. Louis, Mo.—This invention relates to an improvement in the construction of round sifters, sieves, or riddles for sifting flour, meal, and other substances.

PROCESS OF RESTORING SULPHURIC ACID, ETC.—Oliver W. Farrar, Pittsburg, Pa.—The nature of this invention or discovery consists in an improvement in the process of restoring or recovering the sulphuric acid which has been used for refining petroleum, coal oil, naphtha, or other similar hydrocarbon oil or substance.

TURBINE WHEEL.—Albert A. Wood, Manlius, N. Y.—This invention relates to a new rate, which is intended particularly for that class of turbine wheels which is known as Jonval's turbine wheels, but may be applied with advantage to water wheels of various different construction. It consists of a ring or segment provided with one or more lips which correspond in number and position to the guide curves, and which are themselves curved in such a manner that the space or spaces through which the water passes to the buckets of the wheel can be enlarged or diminished, and the water can be always made to run on the buckets in a solid stream. The ring which carries the curved lips is operated by an endless screw and suitable gear wheels.

COFFEE BOILERS.—Edward F. Woodward, Brooklyn, N. Y.—The design of this invention is to furnish housekeepers with an apparatus for boiling tea, coffee, cocoa, or other vegetable substances, and extracting therefrom their virtue and flavors and retaining the same in all their original strength and delicacy.

FENCE.—Thomas Morris, McGregor, Iowa.—This invention has for its object to furnish an improved fence, simple in construction and easily put up and taken down.

COMPOSITION.—Cassius Carroll Peck and Francis Ernest Engelhardt, New York City.—This invention consists in adding to a strong solution of common glue or gelatine, or chloride of lime, or in its place acids, such as sulphuric or sulphurous acid, or any other mineral acid, and bichromate of potassium or any other alkaline bichromate, to which composition a strong solution of penta sulphite of calcium or other sulphite is added.

MOP WRINGER.—O. C. Barnes, Stowe, Vt.—This invention relates to an improvement in the construction of a mop wringer or press, and consists in a rectangular box nearly or quite square to serve as a vessel for holding water instead of a pail, which box is provided with a lever treadle that moves a follower placed on a perforated platform in the upper part of the box in such a manner that it shall press upon and squeeze the water out of the mop.

RAILROAD CHAIR.—J. W. Shively, New York City.—This invention relates to an improved manner of uniting, joining and supporting the ends of railroad rails, and consists in such a construction of the rails and double cheek bar that the friction of the trains passing over the rails is transferred from the edge of the rail to a projection on the chair or cheek bar, whereby the ends of the rails are protected from the hammering and consequent destruction by the trains.

FIRE KINDLER.—Verlin G. Tansey, Quincy, Ill.—This invention consists in providing means whereby the troublesome operation of kindling a fire from either wood or coal may be performed by petroleum or other oil, with the greatest ease and at a very slight expense.

LIQUID METER.—Parcel Brinkerhoff, Chillicothe, Missouri.—This invention consists in constructing an instrument by which I am enabled to measure out and discharge given quantities of liquid by merely turning a lever when the meter is attached to a barrel or a vessel containing liquid, thus obviating the necessity of resorting to measuring cups of different sizes for that purpose.

IMPROVED SUBSOIL PLOW.—Rufus Peet, Castile, N. Y.—This invention has for its object to furnish an improved subsoil plow so constructed as to be easily repaired in any or all of its working parts, which shall be easily worked, and which will do its work effectually, loosening up the soil to any desired depth.

SELF-ACTING WEATHER STRIP.—C. E. Butler, Hudson, N Y.—This invention relates to a weather strip and to the manner of applying the same, and consists in so constructing the fastening and other devices that the weather strip is at all times firmly pressed against the door or window to which it is applied.

PARALLEL VISE.—Isaac C. Tate, New London, Conn.—The object of this invention is to adjust vises or clamps of any suitable construction to the use of carvers and others who have to work on different sides of the article held in the vise, and consists in mounting the vise upon a universal joint so that it can be turned and inclined to any desired degree thereby enabling the turning of the article in the vise to the light or to the front of the operator or to any other desired position.

FIRE ESCAPE.—Robert Mackinzie and James Cooper, New York City.—This invention relates to a fire escape which consists of a car suspended from a rope, the latter passing over a pulley block which is secured to the window frame on which this escape is to be used. The pulley block is attached to a cross head which is fitted into hooks that are screwed or otherwise fastened to the said window frame, and the car is guided by ropes, of which the upper ends are secured to the same cross head, while their lower ends are securely anchored in the ground.

WHEEL FOR VEHICLES.—Elias Hoxy, Montezuma, N. Y.—This invention relates to such an arrangement of the hub of a wheel that a larger number of spokes can be easily arranged in one wheel whereby lighter material may be employed for the spokes as well as for the felloes and whereby the spokes are more securely attached to the hub than was heretofore done. The invention consists in the use of a metal ring arranged around the wooden hub and provided with a zig-zag flange projecting from the center of the ring being arranged around the outside.

CIRCULAR SAW.—J. W. Clark, Iola, Kansas.—The design of this invention is to provide a self-adjusting guard for circular saws for preventing all possibility of accidents while in no way interfering with the operation of the saw or the handling of the lumber in passing it to or taking it from the saw, and at the same time abating the flying saw dust by conducting it under the saw table.

CHEESE PRESS, ETC.—Wm. H. Ragan, Fillmore, Ind.—This invention relates to a new and improved plan of construction of a press adapted to pressing cheese, grapes, apples, and other substances.

APPARATUS FOR DESTROYING MOTHS.—Charles F. Worch, New York City.—This invention consists in the use of a spacious box made of wood or any other suitable material which is made air tight and provided with a furnace and smoke pipes, etc., so that the inside of the box may be heated to about 120° Fah. Furniture, clothing and any other material containing moths can be placed in the box and is then subjected to the heat for from 3 to 10 hours. The heat is not very intense but as the box is air tight the moisture will be extracted from everything in the box, moths as well as horse hair or wool. The moths are soon killed by the extreme dryness, and the eggs are from the same cause soon completely withered.

PUMP.—Thomas Patterson, New York City.—This invention relates to a pump in which a continuous stream of water is made to pass through the suction and discharge pipes. It consists principally in the use of a radial arm or piston that oscillates around the axis of a circular cylindrical vessel. A stationary abutment is arranged in the latter, extending from the axis to the circumference; and on each side of the same are openings of channels which connect the cylinder with the discharge and suction pipes.

MACHINE FOR MARKING CORN GROUND.—George Sprague, Spring Hill, Kansas.—This invention relates to an improved plan of constructing a machine for marking the rows in a field for planting corn.

FASTENING WAGON SEATS.—Elias Hoxy, Montezuma, N. Y.—This invention relates to a new manner of securing wagon seats to the frame or box of the wagon so that neither the sill of the seat nor that of the frame is weakened by boring holes into them for the purpose of securing the necessary bolts or screws. Moreover, the seat is very securely held down and can be very easily removed, if desired.

BONE OR CHARCOAL KILN.—Adam Weber, New York City.—This invention relates to improvements in the construction of kilns for reburning and purifying "bone black" or bone charcoal which has been used in the refining of sugar and became charged with vegetable matter so as to destroy its filtering property.

VENTILATING DOOR.—Theodore R. Timby, Saratoga Springs, N. Y.—The object of this invention is to keep the rooms of a building, those rooms which communicate with the hall, in a perfectly ventilated state by means of openings or holes made through the upper and lower parts of the door and covered by deflectors.

MAGIC ARROW.—H. C. Griffin, Franklin, N. H.—This invention relates to a simple toy for children designed to supersede the ordinary bow and arrow, and it consists of an elastic cord constructed of india-rubber or other suitable elastic material, and having its ends connected to the prongs of a forked barand an arrow provided with a slit near its head to receive the elastic cord, which, by drawing back the arrow is stretched or distended so as to propel the arrow a considerable distance when the same is released.

JACK FOR RAISING AND LEVELING RAILROAD TRACKS.—Seman Taber, St Joseph, Mo.—This invention relates to a new and improved jack for raising and leveling railroad tracks. The object of the invention is to obtain a simple and portable device for the purpose specified, one which may be manipulated and applied with the greatest facility, and constructed at a moderate cost.

METAL WHEELS FOR RAILROAD CARS, ETC.—Samuel Vanstone, Providence, R. I.—This invention relates to an improved metallic wheel, and it consists in forging or striking up the same, or casting them of Bessemer steel or of iron malleableized and then forging them into the desired shape.

BREAD-CUTTING MACHINE.—S. D. Simmons, Brooklyn, E. D., N. Y.—This invention relates to a new and improved device for cutting bread and is an improvement on a machine for the same purpose for which Letters Patent were granted bearing date July 25, 1865. The object of the present invention is to simplify the construction of the machine, reduce the cost of manufacture, and render it capable of being operated with far greater facility.

BEEHIVE.—Volney Leonard, Springfield, Pa.—This invention relates to a new and improved beehive, and has for its object the protection of the bees from the moth, perfect ventilation, uniformity of temperature, and a novel construction of the spare honey boxes and honey board, whereby several advantages are obtained over hives of ordinary construction.

LOCK.—Henry Jackson, Brooklyn, N. Y.—This invention relates to a new and improved lock of that class in which the tumbler or tumblers are attached to a sliding bolt, and has for its object the prevention of the picking of the lock by obtaining a pressure of the tumblers against the stump and thereby ascertaining the precise position of the slots in the tumblers, a practice now very successfully adopted by burglars in picking tumbler locks. The invention has further for its object the obtaining of a firmer or stronger bolt than hitherto, an important feature when the invention is applied to padlocks.

SHEEP SHEARS.—John Ralston, Slippery Rock, Pa.—This invention relates to sheep shears in which a movable cutter is pivoted to the face of the stationary cutter, the latter being divided into two or more fingers or bars presenting so many cutting edges. The movable cutter is operated by the spring and is drawn obliquely across the cutting edges of the stationary fingers, thereby producing a drawing cut requiring less power and producing a cleaner cut than could be done with the sheep shears now in use.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

W. J. T. and J. H., of Fla.—The *Dictator* was built, and launched from the foot of 13th street North River, New York. The first named correspondent is in error. We shall publish an engraving of the vessel in a week or two.

G. K., of Pa.—We have always preferred to have the pressure of the steam in a gate on the top of the valve rather than on the bottom, although the ordinary gate will work either way. When the steam is introduced on the top it helps to keep the valve steam tight on its seat.

G. M., of Mass.—It would seem that a sledge with the handle near its top or head end would be an unhandy implement. The handle should be placed somewhere near the center of gravity in order to balance This is the principle upon which ax heads are hung, and as the sledge has a round handle it would seem to be still more desirable in this case.

D. S. M., of Ill., endorses the statement on page 330 that green wood does not expand on freezing. He is led to his conclusions by observations which have been made in his business, which appears to be that of a cooper.

R. T. W., of Ohio.—When you see a rainbow the sun is always at your back. The sun, the eye of the observer and the center of the arch are in the same line. A rainbow is seldom seen at midday unless the observer stand on an eminence.

H. W. B., of N. Y.—Grain storehouses have been built of iron, as you propose. An establishment constructed on this plan, is described on page 182, last volume SCIENTIFIC AMERICAN, under the heading, "How grain is stored in New York."

L. W. M., of N. Y.—The simplest apparatus for determining the amount of rain which falls, is a cylindrical vessel of tin; a common two quart pail will answer very well. The vessel is to be set where the rain will not be obstructed by trees, fences, or buildings, and after the shower the depth of the water in the cup is to be carefully measured. To facilitate the measuring, the water may be poured into a graduated glass to ascertain the bulk, from which the depth may be easily calculated.

C. H., of N. Y.—"Will the attraction of gravitation alone stop a pendulum?" No.

J. D. R., of N. Y.—We understand that the only requirement by law concerning the composition of the alloy used for the new three and five cent coins is that it shall contain not less than twenty per cent of nickel. The alloy no doubt will be found valuable for other purposes.

D. B. T., of N. Y.—You will find an explanation of the gyroscope in Silliman's and Ganot's physics.

A. B. R., of Wis.—Iron pyrites or native sulphide of iron is now extensively used in the United States as the source of sulphur, in the manufacture of sulphuric acid. The best pyrites contains between 40 and 50 per cent of sulphur. The pyrites which contains much arsenic is of no value.

G. L. C., of La.—Water glass, liquid quartz, and silicate of soda, are different names applied to the same thing. The article is on sale in this city and you may procure it of any druggist who makes his purchases in New York.

M. M., of N. Y.—The working strength of a hempen rope 3 inches in diameter is 7,800 lbs. and its breaking strain is 26 tons.

M. M., of C. W.—Asphaltum or pitch is often used to make the vaults of the character you describe water-proof. There is no other cheap substance which answers its purpose so admirably. It is imperishable of itself and has no chemical action on the wood, stone or metal with which it may come in contact.

J. M. B., of Ky.—A commutator is the name of the device used in galvanic apparatus for changing the direction of the currents of electricity. The word is synonomous with pole changer. In the magneto-electric machine, the electricity is produced in waves in alternately opposite direction, and consequently the commutator is necessary whenever the electricity is to be used for the electrotype process, or for producing electro-magnets.

M. D. S., of Ky., and W. A. C., of N. C.—Good color may be given to electro-gilding and silvering by depositing an alloy with the battery. But the process is quite troublesome and uncertain; it is not much used in practice A simpler and surer plan is to color the goods after the gold or silver has been deposited in the usual way. To give gold surfaces a rich orange tint, take saltpeter 5 parts, alum 2 parts, white vitriol 1 part, copperas 1 part. Pulverize very fine and mix. For use add to the powder sufficient water to give the mixture the consistency of cream, and into it dip the gilded article; or the mixture may be applied by means of a brush. The coating is allowed to dry on the goods, and then they are to be heated in an oven or on a plate of iron until gold becomes of the desired color; the longer the heat is continued, the darker the color. The articles are finally immersed in water to remove the coating. Another mixture used in a similar way is composed of verdigris, alum and beeswax, and turns gold to a reddish cast To whiten silver surfaces, immerse in a saturated solution of borax, dry and heat till the borax is completely melted. The excess of borax may be washed away by dilute sulphuric acid.

R. N. L., of R. I.—The blue woolen cloth which 'crocks' is dyed with prussian blue. The latter is a powder and if you whip the cloth smartly you will see the color fly away as dust.

W. R. D., of N. H.—"Where is the center of motion of a wagon wheel rolling on the ground? My opponents contend that in a wheel revolving on its axle suspended, its center of motion is the center of the wheel, but the instant the wheel is allowed to rest on the ground with the wagon in motion, that the center of motion is changed to that part of the wheel which is constantly on the ground?" W. R. D. is on the right side of the question. The center of a revolving wheel is always a center of motion; for the rolling of the wheel on a plane or on a curve does not alter the relation of the wheel to the center. In the case of the wagon wheel rolling on a plane 'that part of the wheel which is constantly on the ground' is not the center of any actual curve. The particles of the wheel describe cycloids, but the centers of these curves are fixed points; each individual particle describes its own cycloid which has its peculiar center. All motions on the earth are relative, and a moving body may have two or more centers of motion. Thus the wagon wheel has a center of motion in itself, and others, at the center of the earth, center of the sun, and at the center of motion of the universe.

J. W. L., of N. Y.—The force given out by condensed air on expansion is precisely equal to the force which was used in the compression, provided that none of the heat of compression has been lost. The form of vessels used or the rate or manner of compression or expansion, do not affect the question one way or the other.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Manufacturers of clock work to run light machinery send address to A. S. Griswold, Pittsburgh, Pa.

Foundery and Machine Shop wanted at Coloma, Ill. See advertisement and address A. P. Smith, Sterling, Ill.

John M. Hill, Nashville, Tenn., wishes to communicate with parties who make Bedstead Fans driven by Spring Power.

The Bartlett Sewing Machine.—To correct an erroneous impression that may have been given to the public that the shape or form of the Bartlett Sewing Machine is the same as the Willcox & Gibbs Machine, or that there has been a contest in reference thereto, it requires these facts to be stated:

The United States Patent Office issued, among other letters patent for Sewing Machines to JOSEPH W. BARTLETT, *two* patents for "*new* and useful designs for Sewing Machines." One of these patents is for a *circular form* the same as that FIRST used in the Bartlett machines, the other for an elongated form, it being found that this latter form possessed *advantages over* the CIRCULAR form, giving greater space to the "work," etc., and from a similarity of the Bartlett patent CIRCULAR form to that of the Willcox & Gibbs, Mr. BARTLETT, therefore, being desirous to give as distinct a character as possible in the best form to his machines, determined, some fifteen months ago, to adopt the use of the "long arm" form, caused the models to be made and their manufacture begun. They are to be seen at the General Office, No. 569 Broadway, New York.—[*Gazette.*

"We have examined the Bartlett Machines. The mechanism is of the simplest kind—found to be durable and noiseless; the stitch did not rip upon being tested, and is far superior to that of the 'cheap' Machines.—[*Scientific American.*

"These Machines have met with an almost unqualified approbation, and experts on Sewing Machines pronounce it the most simple, perfect Sewing Machine now in market. It gives great satisfaction in our establishment, where we have tested it thoroughly, and it is especially valuable because apprentices who never before worked upon a Sewing Machine can operate it at once."—[*Demorest's Magazine.*

EXTENSION NOTICES.

John Krauser, of Tylersburg, Pa., having petitioned for the extension of a patent granted to him the 30th day of August, 1853, and reissued October 11, 1864, for an improvement in cider mills, for seven years from the expiration of said patent, which takes place on the 30th day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of August next.

Oliver P. Drake, of Boston, Mass., having petitioned for the extension of a patent granted to him on the 30th day of August, 1853, and reissued the 15th day of November, 1864, for an improvement in apparatus for combining hydro-carbon vapor with air, for seven years from the expiration of said patent, which takes place on the 30th day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of August next.

LAW REPORT—IMPORTANT TRADE MARK CASE.

This is an action brought by Amasa B. Howe, brother of Elias Howe, Jr., praying for an injunction to restrain the defendant corporation, of which Elias Howe, Jr., is principal stockholder and president, from selling or advertising any sewing machine bearing the trade mark of "The Howe Machine," or "The Original Howe Sewing Machine," or any title in which the name "Howe" is used.

It appears that although Elias Howe, Jr., was the inventor and patentee, he permitted his brother, the plaintiff, to manufacture under his patent, and that large sums of money had been expended by the plaintiff in perfecting the machine. The decision in the case is based on the following grounds:—

First, Elias Howe, Jr., as the inventor and patentee, had the exclusive right to make and sell this machine.

Second, The license granted to his brother, the plaintiff, conferred on him the right to make and sell only, nor was this an exclusive right, nor did it give him the privilege to use the name of Howe as connected with it, but,

Third, The inventor retained his right to use his own name both on the machine and in connection with its sale, and the plaintiff as partner or agent could acquire no right to the name in opposition to Elias.

Fourth, By a special agreement made in the year 1863, any rights which may be supposed to have existed before that date were surrendered by the plaintiff.

Fifth, It is not denied that a party may take a name and apply it to a machine as a trade mark, but the rule does not apply when it is sought to deprive a party of the use of his own name as applicable to his own patent, and which he had previously used for the same purpose.

Sixth, The judgment is therefore given that the plaintiff is not entitled, on the evidence proposed, to an injunction.

CROSSING THE EAST RIVER.

Since last winter, when on account of floating or fixed ice communication between New York and Brooklyn or Williamsburgh was either cut off for hours or rendered insecure and precarious for days, there has been a desire, not bounded by considerations of the interests of capital, that some more certain if not more rapid means of intercommunication should be contrived. The annoyances of the past winter and early spring are not exceptional; they have been repeated from year to year until the patience of the public has become well nigh exhausted, and the demand is general that some surer means of communication between the metropolis and its most important suburb should be established. A charter for a bridge company was secured at the last legislative session, and we understand that preliminary surveys are now in progress on both sides of the estuary known as East River. The bridge to be constructed will probably be a suspension bridge, with one or two stories, and of a length between points of suspension exceeding that of any other on the continent. But vast as is this undertaking the approaches to the bridge proper, are hardly less in magnitude.

On the New York side they must stretch from the river bank nearly to the City Hall while on the Brooklyn side they reach to the intersection of Sands and Fulton streets. Of course property on the line of these approaches must be more or less injured by the darkening of the windows and the obstruction of travel on the streets. Then, again, if merchandize is delivered from warehouses on the streets lining the river, in order to be conveyed over the bridge it must be teamed a distance to reach the approaches nearly if not quite equal to the breadth of the strait the bridge itself spans. In such cases the present system of ferriage will be preferred, as probably in many cases of foot passengers. If to these obstacles be added the enormous cost of the bridge and the feeling of insecurity, which no course of reasoning and scarcely a demonstration could obliterate from the minds of the people, it would seem that some cheaper and more feasible plan might be adopted.

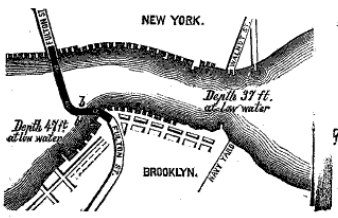


Fig. 4

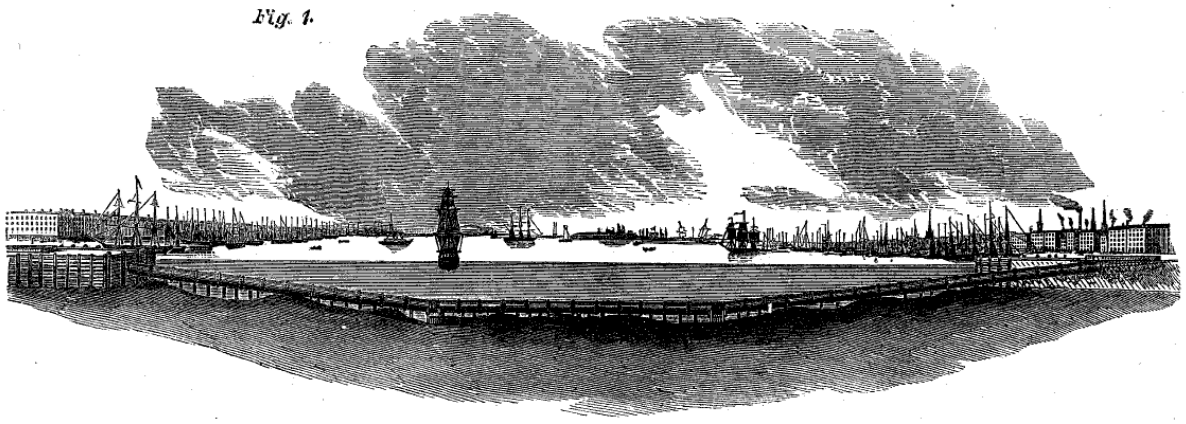
As long ago as 1857 we published (*vide* SCIENTIFIC AMERICAN, Vol. XII., No. 30), a plan proposed by Mr. Joseph De Sendzimir, of South Oyster Bay, Long Island, by which a passage across the East River could be secured without a a structure exposed to gales and without approaches entailing travel of three times the width of the strait. It was, in brief, similar to that now in progress across the Thames at London for the Pneumatic Dispatch. The accompanying diagram shows the plan. It was a submerged tube of iron sunk in the bed of the river, the central portion level and the remainder rising gradually to either shore. In order to diminish the grade, the tube, on the Brooklyn side, where the natural descent is greater than on the other side, makes a curve or bend as seen in the diagram. The deepest portion of the river bed is only forty-seven feet below the surface at low water, and the tube may be either supported on piles driven into the bed of the river or lie upon a bed scooped for it so that the top may reach only to the surface of the bed. That this plan is feasible cannot be successfully denied; that it will offer no obstructions to navigation and the tides, and that it would be removed from danger of disturbance from floating ice and from gales is susceptible of proof. Its cost, estimated at only about $200 per running foot, is so much less than that of any bridge that twelve of these tubes could be laid for the cost of a single bridge. Its approaches could be close to the shore, and therefore not interfere with the rights of property owners. In every aspect the submerged tube appears to be better than the aerial bridge.

Subsequently, as seen in No. 39, Vol. XII., 1857, SCIENTIFIC AMERICAN, we published engravings of a similar plan which we herewith reproduce. It was suggested by H. P. Holcomb, of Winchester, Ga., and the engravings represent a profile view and the entrances, style of tube, and a cross section. In Fig. 1 the tube is shown supported on piles sunk in the bed of the river; Fig. 2, one of the entrances; Fig. 3, a cross section, and Fig. 4 the construction of a portion of the tube, which is of wrought iron. These portions which are corrugated are intended to rest on foundations of piles and the corrugations are intended to strengthen the tube and also to provide for any expansion and contraction. Our opinion is that if the whole tube was built of corrugated iron, it would be immensely stronger and could also be made of thinner iron, thus reducing the cost.

The plan of building the tubes proposed is similar to that followed in the construction of the Pneumatic tube in London; that is that it be built in sections, the ends of which are made water-tight, and then the sections floated to place and sunk by admitting a sufficient quantity of water, to be afterward pumped out. The joints to be made by bolted flanges.

We see fewer objections to this style of crossing rivers, especially when very wide or where a bridge must be very elevated, than to any other. If the tube is sunk in a bed dredged for it there can be no reason why it might not last for generations, especially if, like that of the Thames, it is protected externally by courses of brick masonry. We gave an engraving and description of that tube in No. 11, current Vol. No objection to the submerged tube, except the fact of its situation, would seem to obtain which might not be equally valid when urged against the elevated bridge. Certainly teams and street railway cars could as readily traverse the tube as the bridge. In either case there must be an ascent and a descent. But, beyond the fact of less cost in favor of the tube, there is the superiority in ease of approach and the consequent shortening of the distance. The two plans seem at least worthy comparison by those interested in the subject.

Fig. 1.



MODE OF TUNNELING RIVERS.

Fig. 2

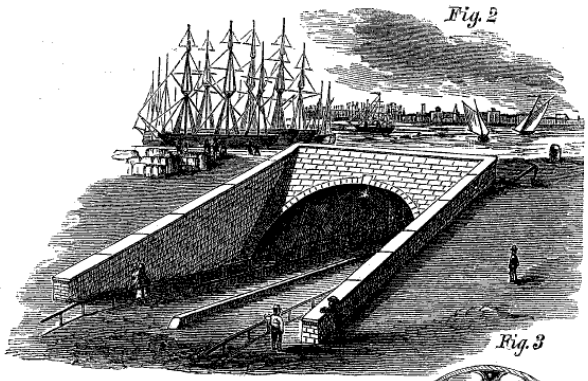


Fig. 3

A New Smelting Furnace.

The works of the Star Glass Company, of Philadelphia, about to be started in Norristown, are furnished with a new style of furnaces with closed ash pits, in which is introduced a blast of air to support combustion with jets of steam in close proximity to the grate bars. The oxygen of the steam combining with the carbon of the burning fuel forms carbonic acid, and in passing through a thick bed of burning fuel it receives another equivalent of carbon and is converted into carbonic oxide; jets of air are forced into the furnace, over the fire among the products of combustion, the oxygen of which unites with the liberated hydrogen, carbonic oxide, and other inflammable gases, producing a clean, intensely hot flame. Nothing is permitted to escape but the incombustible gases. With this furnace it is thought that iron of superior quality can be made from ore with any kind of raw coal, and less than half the quantity used in ordinary furnaces. The cost of the furnace is not over fifteen per cent of that of ordinary furnaces. The ore is desulphurized, deoxydized and carbonized before melting, the sulphur and gas in the coal being decomposed and consumed before contact with the materials to be melted.

APPLICATIONS OF PAPER.

The uses of compressed vegetable pulp, or artificial wood, already very numerous, are multiplying. Among its good qualities, its low conductivity is important and but imperfectly appreciated. Many have seen, and verified by experiment, the statement that the warmest kind of bed comforter can be made by basting old newspapers together. Something in this line might be made a valuable new article of manufacture. Cisterns and water pipes of prepared paper, with a sufficient ingredient or else coating of insoluble substance, have been brought into use in England, for their remarkable resistance to the penetration of frost; or more accurately, their remarkable retention of the heat of their contents. It is stated that at the Albion Works, England, there was in the open yard a large brick tank containing several tuns of water, the ice in which was several inches thick during the severe cold of the past winter. By the side of this was another tank, made of paper boards, the water in which was not the least frozen. Some iron pipes which supplied water to the places in consequence of the freezing of the water which they boiler of the engine house from a large cistern burst in several contained. Some paper pipes, on the other hand, filled with water, and which had been exposed to the snow on the ground, kept the water from freezing. In a model house or hut, made of paper, some water in open bowls and pails did not freeze, though outside the building there were large masses of ice. The manufacture of paper pails has been initiated in this country, and we see no reason why they should not make a superior article. Sugar molds are now made of paper, by the same parties (American Papier Maché Co., Green Point, L. I.) and Messrs. Havemeyer & Elder, the noted sugar refiners, speak in the highest terms of a lot of 4000 of these molds which they have used for a year, preferring them to iron. An all-paper hat is coming into market, as we hear. Paper substitutes for starched linen are in common use, but what shall we say to paper shirts, drawers and hose, for which a patent has been taken out? Is the whole series of metallic ages, silver, gold, brass and iron, to wind up in an age of rags?

Velocity per Hour.

The speed of our ocean steamers in crossing the Atlantic rarely exceeds 11 miles per hour; the speed of river steamers is from 14 to 24 miles per hour; of a race horse from 29 to 30; of a bird 50 to 60; of a high wind 20, and of a hurricane 80 miles; of sound 804; of mechanical force in air 750; of the earth around the sun 68,000; of light, as demonstrated by Foucault's apparatus, 690,000,000 miles and yet this inconceivable speed is little more than half the velocity of static electricity which latter Wheatstone has shown to be 1,040,000,000 miles an hour.

If the earth were a cannon ball shot at the sun from its present distance, and with the velocity it now travels, and if simultaneous with the explosion a telegram was sent to the solar inhabitants, the electricity would pass the intervening space of 95,000,000 miles and the message be received in five minutes; the earth would be seen coming toward them after the lapse of eight minutes; the inhabitants would have nearly two months to prepare for the shock, which would be received over ten years before they heard the explosion.

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THEORIES OF THE STRUCTURE OF IRON.

A highly suggestive paper on the structure of iron was read at a late meeting of the South Wales Institute of Mining Engineers, by M. M. Vivian, Esq. Mr. Vivian's somewhat novel data invite careful testing, and if confirmed, the theory to which they appear to lead would become an interesting subject of discussion, strikingly in harmony with the present tendency of speculation in physics. He asserts positively, from a wide and protracted range of microscopic study of the metals in their various conditions, that they are invariably found (according to previous treatment) in one of these two kinds of molecular formation: either angular and crystalline, or cellular: the fibrous condition being a mechanical modification of the latter, showing under the microscope an ellipsoidal extension and concatenation of the cells, which are at the same time flattened and laminated upon one another like scales, or links in a flattened chain.

We lately quoted a theory which attributed the fibrous condition of wrought metals to the interposition of slag which became minutely flattened and lengthened out within the structure, by the process of manufacture, so as to separate the mass longitudinally into fibers. The more usual and plausible explanation of this condition is that by stretching and doubling a tenacious mass very many times over, a multitude of fresh surfaces are successively formed and brought into contact, which, not being in a state of fusion, cannot mingle their particles, but adhere superficially, with a certain distinctness or separation preserved; so that the mass is made up of minute parallel strips, coherent but not consolidated or mingled, and possessing each in itself the flexibility which is found in a fine thread even of the most brittle substance; while their limited cohesion to each other allows a certain flexible play within the mass, as in bending a bundle of rods. It will be seen that these theories are all ductile enough to be run into each other as one, with a little mutual accommodation, supposing Mr. Vivian's microscopic observations to be correct. Granting the flexibility of puddled iron to be accounted for by the usual explanation above given, it is a question whether some other cause must not be sought for its increased tensile strength. And again, the unsurpassed flexibility and tenacity of Bessemer steel remain quite unaccounted for by the ordinary theory. So that there is unquestionably room for inquiry on this subject.

No metal is ever really solid, and all good malleable iron is "as porous as a sponge." Mr. Graham's researches have shown that the metals absorb and retain mechanically, various proportions of different gases, in their cellular spaces. Mr. Vivian makes the interesting statement, from his own observations, that the best known conductors of heat and electricity, such as silver, copper and iron, have the most perfectly cellular structure, and their conductive power varies in accordance with the variations of this condition. His idea is that the cells afford a vacuous channel for these forces: which is not as philosophical as to suppose that the forces are forwarded by the continuity and elasticity of the cellular partitions.

As to the cause of the exchange of the crystalline for the cellular (or else amorphous) structure, and *vice versa*, the present state of inquiry (for science there is none) allows a variety of conjectures. In the state of fusion, the molecules of the structure are partially liberated by the separative force (heat) from the force of cohesion or gravitation to one another. At the same time the ultimate contents of the molecules themselves may be affected likewise, so as to assume the natural form of matter in freedom (or rather in action, through the force of heat) which is spherical. From this modification of their form and loosening of their cohesion, results fluidity, or the smoothness and freedom with which the molecules roll over one another. Mr. Vivian attributes the alleged cellular formation to an equilibrium of the opposing forces of expansion and contraction, but as these act in exactly opposite directions, the result of their equilibrium would be rest, at a single point of time. If at that point of time the molecular form were fixed beyond disturbance from the further progress and predominance of the contractile force, the result might be a globular, but not necessarily a cellular structure. If on the contrary, the withdrawal of the calorical and ascendency of the contractile force be violently accelerated, it is conceivable that the globular molecules might be riven by an irregular conflict of forces in straight lines, producing a formation in planes, or crystals. The alleged cellular condition of the globular molecules would remain to be accounted for, by enclosed gases for instance—a cause apparently not of sufficient universality—or else by some undiscovered law.

This brings into play Helmholz' new theory of "wirbelbewegung," or vortex motion. Supposing it a law of calorical force (or, as we more habitually regard it, fluid freedom) in matter, to produce motion in circles, we have at once a clear cause for the alleged cellularity, and a clear necessity, both for its maintenance—in case the heat-motion be not suddenly overcome and the arched condition of the matter be enabled to sustain itself without violent opposition until it grows turgid and finally rigid—and on the other hand for its disruption in planes of cleavage, in case the contractile force be suddenly and violently accelerated. This account of the process, if true, would also account for the brittleness of the ruptured and crystalline structure, as well as for its density and hardness. The crystalline or "short" quality of iron worked too hot, would also be explained on the same principle—the sudden contraction from the sudden escape of heat, coöperating perhaps with mechanical force, to rupture the cells or arches at the critical moment of consolidation. We shall not be understood, of course, as advocating any of the actual or supposable theories, which we repeat only by way of information and stimulus to inquiry.

According to Mr. Vivian's observations, the walls of the metallic cells, being smoothly formed and inaccessible to oxidation, are exceedingly brilliant, and reflect light from innumerable facets, when the mass is fractured. As before said, by rolling they are supposed to be flattened out like links, into chains or fibers, and by drawing as wire, this effect becomes still more marked. If then the bar, or especially the wire, be broken short off at right angles, it shows a dull gray color, because we look into the cells lengthwise, and the light is but faintly reflected from their depths. On the other hand, where the bar shows a longitudinal fracture, slightly bent to one side, the most lustrous effects are seen. Mr. Vivian thinks that the tensile strength of wire is reduced by repeated annealings during the process of drawing, in consequence of ruptures of the cells by expansion. If his views are correct, the test of iron and steel which he recommends, by examining the molecular structure with the microscope, when sufficiently understood, would become of great value.

THE COMMISSIONER'S DILEMMA.

We publish in another column a letter from a subscriber setting forth the cause of the delays at the Patent Office, and the reason the Commissioner does not increase the examining force. The Commissioner is to be commended for his forcible though unsuccessful appeal to Congress to give him more room, and for his subsequent effort to get possession of space occupied by other departments which have no right in the Patent Office building, and which ought not to have been allowed to quarter there at first. These various bureaus which absorb so much room needed by the Patent Office, and for the want of which inventors are suffering throughout the land, are like squatters: they have no business to remain, but are difficult to get rid of when once settled. Now what is the remedy? Until Congress assembles—when we hope the Commissioner will again lay his grievances before it, backed by the influence of one hundred thousand inventors in the shape of a petition—the cases in the beautiful Model Hall might be placed nearer together and light partitions constructed, forming rooms for the temporary use of an increased examining force. They might not be so convenient for the purpose as the rooms on the first floor adjoining the Library, Drawing and Record Rooms, but they would certainly be as eligible as those rooms in the basement, and much more cheerful and healthy for the occupants. Any expedient should be resorted to, rather than to have the inventive genius of the country discouraged by lack of desirable room or want of sufficient force to keep the work of the Office up.

We hope to see some immediate action taken by the Commissioner to remedy the evils which have existed too long already, and which are daily increasing. Come, Mr. Commissioner, do devise some way of obtaining room and appoint new or promote some of the most efficient assistants to be first Examiners. Sub-divide some of the over-crowded classes and require that the back work of the Office shall be brought up at once, and when once up, make it incumbent upon the Chief Examiner in each class to keep it so, and if he is unable to do it, to report the reason of his inability when he makes his monthly statement, that a further division may be made, or some other mode devised for his relief.

THE NATURE OF THE PHOTOGRAPHIC IMAGE.

The solution of this problem has for years engaged the attention of scientific observers, and a variety of explanations have been given. One of the most recent theories is that light acts upon the sensitive plate by a sort of mechanical pressure, in proof whereof it has been shown that if an object be pressed against the sensitive film, in the dark, the image of the impressed object may be at once developed, by the use of the usual developing agents.

But by far the most clear and satisfactory explanation of the phenomenon is that presented by M. Carey Lea, in the last number of the *Philadelphia Photographer*, which we publish in another column. Dr. Lea's contributions to chemical photography are widely known for their excellence and accuracy. The beautiful theory now made known by him is the result of a long series of laborious experiments.

THE DAY LINE IN CONGRESS.

In our discussion of the question, When and where the day begins, we ventured the prediction that the subject would some time engage the attention of national legislatures. Our prediction is being fullfiled sooner than we expected. The following is an extract from a recent speech of Senator Sumner delivered on the occasion of the purchase of Russian America:—

> Another change must be made without delay. As the settlements of this coast came eastward from Russia, bringing with the Russian flag Western time, the day is earlier by 24 hours with them than with us, so that their Sunday is our Saturday, and the other days of the week are in corresponding discord. This must be rectified according to the national meridian, so that there shall be the same Sunday for all, and the other days of the week shall be in corresponding harmony. Important changes must follow of which this is typical. All else must be rectified according to the national meridian so that within the sphere of our common country there shall be everywhere the same generous rule and one prevailing harmony. Of course the unreformed calendar, received from Russia, will give place to ours; Old Style yielding to New Style.

The fact to which the Senator alludes is a very curious one,—when we cross the boundary of Russian America we come into another day. There is evidently a need of legislation in this case. But the learned Senator, like some of our correspondents, befogs himself. He appears to imagine that the beginning of the day has some connection with some meridian already established. What does he mean by "national meridian?" There was once an attempt to establish the meridian of Washington for the reckoning of longitude; but that meridian is very little used in practice and it has no relation whatever with what we have called the day line. Moreover, Mr. Sumner appears to attach an unwarranted meaning to the well known expressions, Old Style and New Style. These expressions properly refer to the reform of the calendar instituted by Pope Gregory XII. in 1577, when ten days were dropped from the old reckoning.

THE REGULATION OF TEMPERATURE AND MOISTURE.

All extremes of heat and cold, moisture and dryness, are injurious, but for short periods the human system can easily resist an influence from which injurious effects are experienced after a protracted exposure. Thus the workmen around furnaces never experience from an intermittent exposure the injurious effects to which men are subjected who work on hot summer days in the continuous radiation of the sun and sometimes fall victims to sunstroke.

Short exposure to cold will not produce that injury to a healthy person which follows when portions of the body are thoroughly cooled off and the natural perspiration checked for some time. It is an error to think it better to cool off gradually than to go from a hot fire at once into the cold. On the contrary, when before going out on a very cold day we warm up well before a good fire, and immediately wrap up in a coat or shawl, we find that we can resist the cold much better and longer than when we cool off before going out. It must be noted, however, when we remain in a place which is very warm so long that our perspiration becomes as free as it naturally is in the summer season, and then at once go out into the cold, there is danger of taking cold by the sudden check produced in a perspiration which was too free for the winter season. The artificial heating must therefore be moderate, or if strong, it must be of short duration. A thorough cooling off of the body below a certain standard of temperature (which is somewhat different for different individuls) will surely produce disease, which also will be different in its nature according to the different predispositions of the individuals: thus, by the same exposure to cold one will get a catarrh in the head, another become hoarse in the throat, another will have his respiratory or digestive apparatus disturbed, still another will be visited by rheumatism or neuralgia, etc., and it is one of the duties to be attended to during our material existence here on earth *to know ourselves* in this respect also, in order to guard against the weak points in our constitution.

As healthy as is wet and moisture, when we are exposed to it for a very short period of time (witness the use of baths, etc.), just as injurious is it when protracted beyond reasonable limits. Even when the moisture is only in the air in great excess, it is injurious to live in this air, as is proved by the unhealthfulness of low, damp localities, whether in a temperate or hot climate: such a damp air will always be a continuous check to the perspiration, as it does not absorb the invisible moisture which is always passing off the whole surface of the body, and which is so readily removed by dry air. Besides this, a damp atmosphere is very favorable to the generation and development of the fever-producing miasma.

But the most dangerous enemy we have to contend with in our climate is the extreme dryness of the air in the winter season. Cold air has much less capacity for absorbing moisture than warm air, while the general evaporation of course supplies less moisture for the atmosphere to absorb in winter than in summer. Now when we heat this cold dry air in our rooms in winter, we increase its capacity for watery vapor, and consequently its relative dryness. In this condition the air powerfully absorbs the moisture from all surfaces, those of the skin, throat and lungs not excepted. The air of every room should be supplied with moisture from the evaporation

water in connection with the stove or furnace. For a middle-sized room the evaporating surface should be about half a foot square. Unfortunately many furnaces and stoves are not provided with this arrangement, and where they are, too often the addition of water is entirely neglected, and the consequence is that the inmates of the place live in an atmosphere so dry as to injure their respiratory organs, produce pains in the throat, or rush of blood to the head, increase all kinds of pulmonary trouble, etc. On the other hand, an excess of vapor from keeping the water too hot may produce a deposit of moisture on the walls, and prove injurious. This is easily guarded against. To steam coils a small stop cock may be attached, from which by operating it a small amount of steam may be discharged from time to time: when not neglected, this is an excellent arrangement.

In many churches and public buildings in our cities, and even in private residences, this deficiency of water in the heating apparatus is very evident in the effects it produces on delicate lungs and throats, and this dry air is often made worse still by being heated in contact with the red-hot iron of the stoves. The air should not be scorched by contact of a small surface of red-hot iron, but it should be heated by a more prolonged contact with a larger surface of iron moderately heated, and always come also in contact with tepid water, which will correct the drying effect of the hot iron and make the air more congenial to the moist surface of the throat and lungs.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The seasonable subject of the ice manufacture first engaged the attention of the members of this club at their last regular meeting held on the 6th inst. Prof. Vander Weyde proposed a new plan for freezing water on a large scale. Most ice machines ever invented depend for their succeseful working upon the principle that any liquid forced to evaporate draws the heat which is absorbed during the process, from the most available source. If now ether, or other volatile liquid, under the exhausted receiver of an air pump is rapidly vaporized, it draws from water with which it is placed in contact, its latent heat, and the latter is thus chilled, and in time frozen. The cost of the evaporating liquid hitherto employed, has made the manufactured ice very expensive. Prof. Vander Weyde proposed using chimogene, one of the products from the distilling of petroleum, for this purpose and stated that ice could now be made so cheaply that it must come into practical use, rather than depend upon an uncertain and variable natural supply.

Dr. Bradley at a previous meeting had described a plan for preventing boiler incrustations by making the boiler form part of an electrical circuit, having the poles of a Daniell's battery connected with its ends. He cited on this occasion, two instances wherein his plan had been tried, and in both cases boilers using Croton water, and having incrustations one eighth to three sixteenth inches thick, were entirely freed in less than five weeks. He also offered a hypothetical explanation of the causes and process of removal. One of the members claimed that only two even well attested cases alone were not sufficient to prove the plan effectual or not.

Mr. Maynard exhibited a new wooden street-pavement that had come under his notice, and believing the principle a good one he wished to make it public For facility in removal for the purpose of repairing the sewers, gas mains, or water pipes, this pavement is made in blocks one foot square. The surface is grooved like the Nicolson pavement, to a depth of seven or eight inches, but unlike that pavement the blocks are cut in two directions at right angles so that a firm footing may be obtained by the horses in crossing streets paved in this manner. The crevices are filled with the usual composition of tar, pitch, and gravel. This plan it was stated, has been heartily approved by the engineer of the Croton Board.

Two weeks since the question was raised at a meeting of this club, whether the water of this city acted, or not, on lead pipe. To test the matter Mr. Read purchased 150 feet, filled it with the water and sealed it in the presence of the Secretary of the Institute. At this meeting after the expiration of twenty-four hours, the seal was removed and the water when tested with sulphuretted hydrogen gave evident traces of the presence of lead. The pipe used was new and it is well known that an insoluble coating becomes formed on the inside after using it for a short time, but the result showed that in the large number of houses fitted with new pipe every year, thousands are annually poisoned in this way. Moreover the slightest jar, even the turning of a faucet, it is asserted will separate this coating and the action of the water will then recommence.

At the close of this discussion a vote of thanks was tendered Prof. Tillman for the able manner in which he had presided over the meetings of the past year. The meeting then adjourned until the second Thursday in September.

ONE CENT A MILE.

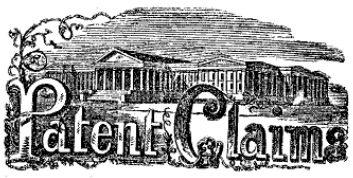
The united management of the Hudson River and Harlem Railroads has undertaken to extend its sway over the river also, with a view to maintaining fares at its own figure, by means of a notification to the steamboat proprietors that any movement in the reduction of fares on the river, should be met by a reduction of the railroad fare to $1 50: the intention of course being to "fight it out on that line" until the steamboats are run off the river or brought back to fares agreeable to the railroad interest. The steamboat men are tough and plucky, and those who remember when passengers were carried to Albany for twelve and a half cents by steamboat competition, before the railroad was thought of, have no fear that the mighty Hudson and its navigators are to become an appanage of a railroad company.

Origin of Petroleum.

There have been numerous theories proposed to account for the production of mineral oils; among which the following is advanced by Professor Wilbur in a lecture at Hamilton, C. W. He believes that oil has been formed from marine vegetation, just as coal has been formed from land vegetation. Seaweed has a large proportion of oily carbonaceous matter, and few persons have any adequate conception of the immense growth and deposit of this product in the ocean bottom, every year. Each crop, after fulfilling its term of growth, becomes detached and sinks to the bottom, naturally accumulating in the hollows or pockets. As it is a received opinion among geologists that this portion of the North American continent was once the bed of a salt-water ocean, the accumulated masses of seawead, after being covered with deposits of stratified rock, might with probability be supposed to have eventually the form of a hydro-carbon oil. Moreover, the Devonian rocks which contain these deposits, were also the rocks in which salt was found, in immense subterraneous reservoirs of brine, now condensed or saturated far beyond the saltness of the ocean. These two deposits, oil and salt, were thus brought closely together in point of geological time. The salt was allowed to be an ocean deposit, and if so the inference was fair that the oil was one also. Moreover, Berthelot has also suggested a new theory of the origin of petroleum. Acetylides are always formed when carbonic acid comes in contact with the alkaline metals at a high temperature. The earth is everywhere impregnated with carbonic acid, and Daubrée has recently shown good reason for believing that the terrestial mass contains melted alkaline metals in the interior. From the acetylides thus supposed to be formed, bitumen and tars are produced by the perpetual reaction of hydrogen, and at one of the stages, these reactions are capable of producing a series like the American petrolenm.

THE SANDWICH ISLANDS.—The exhaustion of the native population which has been going on for a great number of years, seems to be accelerated of late. During the last six years, there has been a decrease of over 9,000. The death rate among the natives is now about 1,500 a year over the births; and with an increasing ratio, this decimation will work the extinction of the race in a quarter of a century. European, but more especially Californian enterprise already sways the development and the institutions of these islands, and the proximity and unequalled energy of our Pacific states must inevitably draw them at no distant day under the protection if not the possession of the Union.

A SELF-DISINFECTING CAR for the transportation of fresh meats, fruits etc., has been fitted up for an experimental trip, in the following manner: A small closet is placed in each end of an ordinary car, with apertures near the floor and roof, a deposit of ice at the top, and beneath this two shelves of wire, one covered with lime and the other with charcoal. The heated air at the top of the car enters the upper opening, is cooled by the ice and descends, passing through the disinfectants and becoming purified, and thus creating a constant current and circulation of air. The application of the apparatus to dwellings, chambers and sick rooms, is also contemplated.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JUNE 4, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
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☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

65,326.—GATE.—Philip M. Ackerman, Webster, N. Y.

I claim the loose sliding bar, D, having a suitable supporting head, H, in combination with the sliding gate, substantially in the manner and for the purposes herein shown and described.

65,327.—GATE.—J. B. Alexander, Washington, D. C., assignor to himself and James C. Duncan, Olney, Ill.

I claim a gate so constructed as to be suspended by chains attached to and wrapping spirally on the center piece, D, causing the gate to close of its own weight, or the same device composed of any other material, substantially as described and for the purpose set forth.

I also claim the plug, I, and K, and the bores, R and Q, substantially as described and for the purpose set forth.

65,328.—SELF-LUBRICATOR.—John Bachelder, Norwich, Ct.

First, I claim the revolving plate, c, the conductor, d, the vertical flange, e, the hood, i, and the arrangement of the bar and strainer, g, in the dripping pan.

Second, The combination of the revolving plate, c, and the conductor, d, or its equivalent, all for the purposes herein described.

65,329.—TRUSS.—Horace R. Ball, New York City.

First, I claim the bar, B, pivot, c, link, D, and set screw, C, for regulating the lateral set or facing of the pad, A, all arranged and acting as herein shown and described.

Second, I claim the bar, B, socket, b, and set screw, g, in combination with the hoop, K, and pad, A, for regulating the vertical facing or set of the pad, as and for the purpose set forth.

Third, I claim a pad, A, having a bar, B, socket, b, pivoted to the end of the hoop, K, by a pivot, f, and set screw, j, for regulating the pressure of the pad upon the body, arranged substantially as herein shown and described.

Fourth, I claim the combination of the pad, A, bar, B, with a perforated fan tail, H, pivot, I, set screw, i, and hoop, K, for throwing the pad below or above the hoop, substantially as herein explained.

65,330.—MOP WRINGER.—O. C. Barnes, Stowe, Vt.

I claim the follower, D, with the jointed head block, g, in combination with the treadle bar, b, arranged and operating substantially as and for the purpose herein set forth.

65,331.—CAR COUPLING.—J. B. Behrens, Pearl, Ill.

I claim an improved car coupling formed by the combination of the peculiarly constructed bumper heads, A and B, jointed coupling bar, D, spring, E, supporting rod, F, uncoupling lever, G, and operating rod, H, with each other, substantially as herein shown and described for the purpose set forth.

65,332.—WAGON BRAKE.—C. G. Bennet and S. A. Drake, (assignors to C. G. Bennet), Farmer Village, N. Y.

First, We claim, in combination with the brake bar, b, the relieving or raising cam, C, constructed and operating as and for the purposes herein shown and described.

Second, Suspending the brake blocks, B, of wagons and other vehicles from an axial point located near that of the ground wheels, w, substantially in the manner and for the purposes herein shown and described.

65,333.—MANUFACTURE OF STEEL.—A. B. B. Berard, Paris, France.

First, I claim the peculiar arrangement or construction of a reverberatory furnace with a double movable sole plate, as hereinbefore described and shown in figs. 1 2 and 3.

Second, The interposition of a bed of fuel in the current of the gas, as hereinbefore described.

Third, The mode of action of the gas, of the steam, and of the air, on or in the interior of the metallic bath, in the manner hereinbefore described.

Fourth, The arrangements, above described, for causing the scoriae to act on the metal for eliminating the phosphorus and other injurious foreign matters therefrom, as hereinbefore described.

Fifth, The reaction of heat from the oxidizing sole plate on the reducing sole plate, as hereinbefore described.

Sixth, The arrangements for operating at will by way of oxidation and reduction, successively, for purifying cast iron and for its reduction into steel or iron.

65,334.—HAME STRAP.—Martin T. Briggs, Schoolcraft, Mich.

I claim a jointed metallic hame strap composed of three parts, A B and C, constructed and operating substantially as set forth, and provided with a holding device to lock and retain the parts in holding positions.

65,335.—MEASURE OF LIQUIDS.—Parcell Brinkerhoff, Chillicothe, Mo.

First, I claim the central tube, C, having index levers, E F, spirally arranged perforations, b, in combination with the tube, B, of the vessel, A, having corresponding perforations and graduated top, G, and operating substantially as described for the purpose specified.

65,336.—STEAM ROTARY VALVE.—R. F. Brown, Savannah, Ga.

I claim the arrangement of the induction passage, C, eduction passage, D, with reference to the passages, C C, and valve, B, substantially upon the principle and in the manner as herein set forth.

65,337.—CHURN POWER.—James Budd, Pittsford, N. Y., assignor to himself and J. W. Briggs.

I claim the lever, B, in combination with the churn and the wheel, W, when the said lever is provided with a variable axial point with relation to the roller, r, as shown at f, substantially as and for the purposes set forth.

65,338.—BOLT AND RIVET TRIMMER.—M. D. Budd, Roscoe, Ill.

I claim the combination of the spring, g, the clasp, d, and the guide, h, arranged substantially as described.

65,339.—MACHINE FOR SHOTING METALS.—W. Butcher, Jr., Sheffield, Eng., and Thos. Shaw, Philadelphia, Pa.

First, I claim the employment of a rotating disk for the purpose of throwing molten metal off in particles, as set forth.

Second, The employment of configurated heat-enduring substances, for the purpose described.

Third, The introduction of water passages, substantially as and for the purpose set forth.

65,340.—WEATHER STRIP.—Charles E. Butler, Hudson, N. Y.

I claim the elastic weather strips formed by combining with the slotted strips, B, the slotted plates, C, screws, D, and springs, E, all made and operating substantially as herein shown and described.

65,341.—TINNERS' STOVE FOR HEATING SOLDERING IRONS.—C. A. Buttles and James Cowles, Milwaukee, Wis.

We claim dividing the interior of the stove or fire pot, by a perforated division or partition plate, d, in combination with the divided exit flue, c, and its damper, g, substantially as and for the purpose described.

We also claim the bent arm and weight, k m, in connection with the hinged lid, E, as and for the purpose described and represented.

65,342.—PROTECTOR FOR CAR WINDOWS.—Henry G. Carr, Lewistown, Pa.

I claim the self-acting grooved protector, constructed and operating herein described and for the purposes set forth.

65,343.—BASIN PLUG.—William S. Carr, New York City.

I claim the plug for waste waterways, provided with an elastic disk, and guided in the manner as and for the purposes set forth.

65,344.—TRUNK.—E. P. Carter, Arcade, N. Y.

First, I claim as an improvement in the construction of trunks and valises, forming the hinges by connecting the ends of the incircling bands of the cover to the incircling bands of the body, substantially in the manner set forth.

Second, Providing the front ends of incircling metallic bands of trunks and valises with links for the reception of connecting straps, as and for the purposes shown and described.

65,345.—STEAM AND WATER-HEATING APPARATUS.—Alanson Cary, New York City.

I claim the combination and arrangement within the case, D, of one or more series of inclined steam cases, A, united together at their edges by means of the angular plates, and connected by steam pipes, B, each plate provided with air tubes, C, passing through them, the tubes in the lower series not being in the same vertical pane with the tubes in the upper series of cases, substantially as described and for the purpose specified.

65,346.—PRESS OR COVER FOR TUBS OR BARRELS.—Hiram L. Chase, Bath, Me.

I claim the combination of one or more eccentrically pivoted arms, C, or their equivalent, with the cover or press, A, substantially in the manner herein shown and described, and for the purpose set forth.

65,347.—GUARD FOR CIRCULAR SAWS.—J. W. Clark, Iola Kansas.

I claim the saw guard, B, provided with the self-adjusting drop, c, and suspended on the vibrating frame, D, constructed and operating substantially as and for the purposes herein described.

65,348.—SELF-LUBRICATING HANGER AND BOX FOR SHAFTING.—Wellsly W. Crane, Auburn, N. Y.

I claim, First, The adjustable hanger, when constructed substantially as above described, so as to adjust both on the vertical and horizontal planes, as above set forth.

Second, The combination of the vertical and horizontal joints above described, when used for the purpose and constructed in the manner, substantially as above specified.

Third, In combination with the above joint, I claim the self-lubricating box, when used as and constructed substantially in the manner specified.

65,349.—CONSTRUCTING SELF-LUBRICATING PULLIES.—Wellsly W. Crane, Auburn, N. Y.

I claim, First, The chamber, E, above described, when used substantially in the manner and for the purpose above specified.

Second, Constructing the internal or shaft bearing, A, independent of the main portion of the pulley, as and for the purpose above described.

Third, Leather-edging the ends of the pulles, for the purpose and in the manner above set forth.

65,350.—PLASTER SOWER.—F. P. Cullom, Dowagiac, Mich.

I claim, First, The construction of the hopper of a plaster sower of stationary ends, a a, stationary inclined side, b, reciprocating slide, c, and pivoted adjustable side plate, b', substantially as described.

Second, The corrugating of the inner surface of the slide, c, in combination with the corrugated side plate, b', and means for regulating the discharge of plaster from the hopper, substantially as described for the purpose set forth.

65,351.—BRICK MACHINE.—J. B. Curtis, Hillsdale, Mich.

I claim the inclined planes, J, carriage, K, and molding boxes, S, as arranged, in combination with the clay box, L, jack mold, M, and follower, N, when operating conjointly for the purposes and in the manner set forth.

The arrangements of the shafts, D G, cranks, E H, arm and link, Q R, in combination with the carriage, K, for the purpose and in the manner substantially as described.

65,352.—DRYING LOAVES OF SUGAR.—William Morris Davis, Philadelphia, Pa.

I claim forming a loaf of sugar with a hole through or into the interior of the loaf for the purpose of expediting the operation of drying sugar loaves.

65,353.—WATER DRAWER.—James Daykin, Cleveland, Ohio.

I claim, First, The pivoted head board, I, arranged in relation to the valve of the bucket, substantially as and for the purpose specified.

Second, The adjustable head board or plate, I, and tilting board, L, in combination with a chain or rope, E, valve rod, H, and bucket, D, when arranged and operating in relation to each other substantially as and for the purpose set forth.

65,354.—GATE.—John Dickason, Veray, Ind.

I claim, First, The system of lever handles, n and n', connecting bars, o and o', and circular lever bar, D, in combination with the gate, A, all arranged and operating substantially as and for the purpose specified.

Second, In combination with the gate, A, and the U-shaped lever bars, E and E', which operate the cranks, f and m, the connecting bars, e and l, and the vertical lever, F, and circular lever bar, D, arranged and operating as described.

Third, The adjustable screw bolts, b and d, circular lever bar, D, or its equivalent, the post, C, and gate, A, arranged substantially as herein described and for the purpose specified.

Fourth, The latch, G, consisting of the latch bar, c, secured to the spring, p, by the clamping strap, p', and the hand lever, r, as described and for the purpose set forth.

65,355.—HAY AND STRAW CUTTER.—John H. Dickinson, Chicopee Falls, Mass.

I claim a device for cutting hay and straw wherein the cutter shall rise and fall on the arc of a circle, using for that purpose the levers, C C, the cutter, A, the connections, F, the shaft, G, and the swing catch, K, in combination.

65,356.—APPLICATION FOR SOFT METAL BEARINGS FOR WAGON AND CARRIAGE BOXES.—George W. Disman, Upper Sandusky, O.

Iclaim making carriage boxes by first preparing soft metal rings of copper or a composition of which copper is the basis, and placing said rings upon a sand, or other core, and laying them in a properly prepared mold, and running molten cast iron on or around said rings, as and for the purpose described.

65,357.—PLOW BEAM.—Walden Eddy, Greenwich, N. Y.

I claim, First, Forming the adjusting bolt, B, solidly upon and out of the forward end of the plow beam, A, substantially as herein shown and described.

Second, Securing the rear end of the draft bar, F, in the space between the bars, a1 and a2, of the plow beam, A, by a bolt, G, passing through an eye or hook, f2, formed upon the rear end of the said draft bar, F, substantially as herein shown and described and for the purpose set forth.

65,358.—SAW SET.—James E. Emerson, Trenton, N. J.

I claim, in combination with the stock or swage head, the adjustable or movable lips for giving to the tooth of the saw the shape or form herein shown and represented.

65,359.—GATE.—B. Homer Fairchild and Emery Sadler, Farmington, Mich.

First, We claim the latch, D, constructed substantially as described in combination with the post, A, and projecting bar, c', of the gate, C, substantially as herein shown and described.

Second, The pivoting attachment, E F G, constructed substantially as described in combination with the post, D, and the upper horizontal bar, e', of the gate, substantially as herein shown, described and for the purposes set forth.

65,360.—MACHINE FOR DRIVING NAILS.—Dennis L. Falardo, New York City.

I claim the revolving wheel reservoir, d, formed and fitted as described to the tube, A, in combination with the tubo and the machinery connected therewith, in the manner and for the purposes set forth in the specification.

65,361.—MODE OF RECOVERING WASTE ACID FROM REFINING PETROLEUM.—Oliver W. Farrar, Pittsburgh, Pa.

I claim the improved process of diluting the spent acid of oil refiners with weak sulphuric acid, as and for the purpose herein specified.

65,362.—WASHING MACHINE.—M. S. Fellows, Livonia, N. Y.

The arrangement of the roller, F, hinged pounder roller, D, corrugated concave, B', and dash board, d, in connection with the fountain or supply chamber, w, as and for the purposes set forth.

65,363.—CONSTRUCTION OF SEWERS AND DRAINS.—Daniel H. Fernald, Bangor, Me.

I claim the adjustable indexed former, D, substantially as and for the purposes specified.

65,364.—FIREPLACE.—John U. Fiester, Winchester, Ohio.

I claim the combination of the plates, D and E, key, s, when constructed and arranged as described and placed over an open fire grate, the parts operating as set forth and for the purposes described.

65,365.—BUILDING BLOCK MACHINERY.—A. L. Finch, Sing Sing, N. Y.

First, I claim constructing the mold for building blocks of a detachable metal frame with a lining of plates of steel held in place by screws passing in from the outside of said frame, in the manner and for the purposes specified.

Second, The slide, i, that removes the pressed block and brings the loose material into position for being pressed in combination with the stationary knife for equalizing the thickness of the block, as specified.

Third, A movable board applied to the side of the mold frame as specified in combination with the slide, i, and stationary knife, for the purposes and as set forth.

Fourth, The arrangement of the slide rods, 5 and o, and cams, p q 7 and 8, for operating the feeding slide, l, and giving a vertical motion to the mold bed, substantially as set forth.

Fifth, Connecting the gate of the feeding hopper with the mold bed by an adjustable connection so that the supply of material can be regulated and the gate be opened by the motion of the mold, as specified.

Sixth, The shaft, C, and the sectional gear, e, for raising the compressing hammer, c, in combination with the mechanism moved by the same shaft, substantially as specified for giving motion to the feeding slide and to mold bed, k, as set forth.

65,366.—SODA FOUNTAIN.—E. D. Finch, Stanton, Mich.

I claim the arrangement of annular refrigerating and non-conducting chambers, B C, inclosing a central ice chamber, D, and provided with faucets, F and H, for the purposes explained.

65,367.—BEEHIVE.—E. A. Floyd, Mrcomb, Ill.

First, I claim a beehive consisting of an outer case, A, resting close on a bottom board and an inner case, B, having its lower portion consisting of a strip of smooth metal with its edge projecting from the bottom board with the covered passage way, n, leading from the outside to the inner case, as shown and described

Second, The pivoted bars, a, arranged to operate in connection with the cases, A and B, as described.

65,368.—KEG AND BARREL FOR PAINT AND OTHER MATERIALS.—Arthur L. Freeman, Manchester, England, assignor to Sewall S. W. Folsom, Boston, Mass.

First, I claim the fastening strap, g, made as a handle for the keg head and so as to be employed for fastening the head and the upper hoop to the keg, in manner as specified.

Second, The connection of the upper hoop in two sections, m n, connected by rivets or joint pins, as set forth, and so applied to the keg as to enable either or both of such sections to be turned up and used as a bail, as specified.

Third, The combination as well as the arrangement of one or more legs or arms, o o, with the keg and the said hoop made in two parts or sections, m n, such arm or arms and sections being applied together and to the keg by means substantially as specified.

Fourth, The construction of the staves or body of the keg or vessel with the annuler shoulder, b, and the head with the raised flanges and also with the fastening strap formed either with or without the handle as above mentioned; the flange by its elasticity serving to make a tight joint and the fastening strap to hold the flange and the rest of the head in place, relatively to the shoulder, as specified.

65,369.—MACHINE FOR WASHING SAND.—James French, Bellevernon, Pa.

I claim, First, Washing and elevating sand by a wheel working vertically or nearly so, in a con ave trough, such a wheel being provided on its outer cir umference with blades inclined to the plane passing through them and longitudinally through the axis of the wheel to which they are attached, substantially as and for the purposes above set forth.

Second, The method of elevating and discharging sand from one basin into another by carrying the sand up on the blades of one or more elevating wheels and washing it into another basin or cisternby a jet or jets of water playing on such blades, substantially as and for the purposes described.

65,370.—PROPELLER.—Herman Fromm, East New York, N. Y.

I claim the combination of a windmill and an ordinary horse-power with the screw shaft of a vessel, substantially as described for the purpose specified.

65,371.—WATCH.—H. Ganney, Louisville, Ky.

First, I claim securing the outer end of the balance spring of a watch to a stud formed with two spring arms, C C2, having set screw, D, when arranged and connected together substantially in the manner described and for the purpose specified.

Second, Forming each arm, C C2, of brass and steel, substantially as and for the purpose described.

Third, Securing the outer end of the main spring of a watch movement to and within the barrel by means of a supplementary spring coiled in the reverse direction, substantially as and for the purpose specified.

65,372.—PORTABLE FENCE.—Manson F. Gibbs, Livonia, N. Y.

I claim locking the two vertical stakes or bars, C and E, together at the bottom by means of pins, c, or their equivalents, entering the bed plate, B, and at the top by passing the ends, c, through a suitable mortise in the diagonal brace, A, the foot of that being similarly locked to the bed, B, as and for the purposes set forth.

65,373.—CAR COUPLING.—M. F. Gibbs, Livonia, N. Y.

First, I claim the hinged bail, C, with its projecting cam or latch, D, in connection with the spring, s, substantially as and for the purposes shown and described.

Second, The combination of said spring bail, C, and the latch with the automatic "pin dropper," substantially as and for the purposes set forth.

65,374.—SEED BOX FOR GRAIN DRILLS.—Charles H. Godfrey, Stewartsville, N. J.

I claim the irregular cams, e, on the stirring shaft, D, of a seed box for grain drills, substantially as and for the purposes described.

65,375.—COOKING STOVE.—Wm. A. Greene, Troy, N. Y.

First, I claim, in combination with an oven front plate, a shelf plate, a, so constructed and arranged in respect to said oven plate as to form in connection therewith a hollow shelf plate, substantially as and for the purposes set forth.

Second, The detachable shallow shelf plate, a, applied below the grate and above the ash box, in combination with the front oven plate, B, and the perforated side plates, F, substantially in the manner and for the purposes herein described.

Third, The angular shelf plate, a, substantially as and for the purposes described.

65,376.—MAGIC ARROW TOY.—H. C. Griffin, Franklin, N. H.

I claim the elastic cord, B, attached to a forked or other suitable bar, A, and the notched arrow, C, all arranged substantially as and for the purpose specified.

65,377.—MODE OF DRYING GLUE.—George Guenther, New York City.

I claim the mode of drying glue by revolving or rotating metallic surfaces having their temperature raised either by steam or hot air, substantially as described.

65,378.—CLAPBOARD GAGE.—George Hall (assignor to himself and Wm. S. Waldron), Middletown, Ohio.

I claim the combination of the rule, B, with the gage plate, C, when hinged upon the handle, A, in the manner described and for the purpose set forth.

65,379.—WOOL-PACKING TABLE.—William S. Harris, Eckford Township, Mich.

I claim, First, The employment of longitudinal and lateral grooves in the upper face of the packing head, M, in combination with the notches in the table flaps to secure the baling twines, o, when said head is so arranged as to project above the surface of the turned down flaps, substantially as set forth.

Second, The abutment pins, F, in connection and combination with the flaps, F1 F2, for forming a top abutment over which the fleece may be tied both ways, substantially as specified.

Third, The use and combination of and jointed clamps, H H, in combination with the spring stops, S, for securing the table flaps when acting as a press box, substantially in the mode herein described.

65,380.—NUT MACHINE.—James Haslam (assignor to M. J. Coleman), Philadelphia, Pa.

I claim the catch, G, constructed and arranged substantially as described in combination with a nut machine, for the purpose set forth.

65,381.—BEEHIVE.—Joel Heacock, Marlboro, Ohio.

I claim the quadrangular sheet metal slide, E, fitting into the lower part of the hive, A, and sliding between guides, c c, its bottom edges resting upon a stand or table between the feet, f, and provided with the entrance, g, substantially as described for the purpose specified.

65,382.—PESSARIES.—E. F. Hoffman, Poughkeepsie, N. Y.

I claim a pessary made wedge-shaped and provided with concave surfaces, b c, an elevation, a, and flat retreating surfaces, e, substantially as and for the purposes set forth.

65,383.—BRICK MACHINE.—James Hotchkiss and Ezra Russ, Springfield, Ohio.

We claim, First, The combination and arrangement of the driving cam, wheel, C, and rock shaft levers, E F, for operating the mold wheel and pressing toggles, substantially as herein specified.

Second, The combination of the pawl, H I, adjustable in length with the notches, J J, in the periphery of the mold wheel on their equivalents, substantially as and for the purpose herein set forth.

Third, The employment of the pipe, g mill beyond the center of the mold wheel so that the latter may extend under the entire bottom of the former without diminishing the diameter of the same, substantially as and for the purposes herein specified.

Fourth, The employment of the bottom plate, V, of the pug mill as a bearing for the upper journal of the mold wheel the said plate being secured to the frame work by suitable projections, a a a, substantially as and for the purpose herein set forth.

Fifth, The central depressions, w, in top of the mold wheel when combined with the extension of the bottom plate of the pug mill downward therein for the purposes herein set forth.

Sixth, Forming the pressure plate, n, mortise or guide in an extension of the bottom plate, V, of the pug mill as set forth.

Seventh, The combination with each other of the mold wheel, W, the arc-shaped groove, m', in the bottom of the pug mill, the crescent shaped apertures, K, through the same, and the fillers, r r, arranged and operating together, substantially as and for the purposes herein specified.

Eighth, The employment of two scrapers, P Q, acting successively one while the clay is under pressure and the other after the clay is relieved from pressure, substantially as and for the purpose herein set forth.

Ninth, The movable scraper, A' acting in the opposite direction to that of the stationary scrapers, substantially as and for the purpose herein specified.

Tenth, The lowering of the followers so as to sink the bricks after being molded somewhat further in the molds to receive the pressure of the piston, substantially in the manner and for the purpose herein specified.

Eleventh, The adjusting screws, b' b, which support and adjust the followers in the mold when they are set in bars a' which project into the mold mortises, substantially as specified.

Twelfth, The construction and arrangement of the toggles, M M, with the spring, m, and operating upon each other by a cam action, substantially as herein set forth.

Thirteenth, The vibrating tilter, T, when operated by a lever, U, and cams, T T, substantially as herein specified.

65,384.—SECURING WAGON SEATS.— Elias Hoxie, Montazuma, N. Y.

First, I claim the securing the seat to the wagon sill by means of two or more bolts, F, in the pending from the sill, A, to the sill, C, so that no holes are made in either for the said bolt to pass through, nor are they otherwise weakened as set forth.

Second, The bolt, F, in combination with the nut, D, and slotted plate, E, all made and operating substantially as herein shown and described.

65,385.—WHEELS FOR VEHICLES.—Elias Hoxie, Montzuma, N. Y.

I claim the metal ring, B, arranged around the hub, A, and provided with a zig-zag flange, C, substantially as herein shown and described.

65,386.—RUNNING GEAR FOR HARVESTERS.—Moses G. Hubbard, Syracuse, N. Y. Antedated May 26, 1867.

I claim the vertical handle, A, in combination with the cam, D, formed in the horizontal plate, B, and with that part of the gear designed to be moved or shifted by said gear, substantially as and for the purpose set forth.

I also claim the employment of the bolt plate, L, constructed as described for securing the bolts, substantially as and for the purposes specified.

I also claim the location and arrangement of the spring, G, upon the shifting lever and in relation to the shifting gear, substantially as and for the purposes described.

65,387.—MODE OF DESULPURIZING ORES AND EXTRACTING GOLD AND SILVER.—William W. Hubbell, Philadelphia, Pa.

I claim saturating the pulverized gold or silver ore with saltpeter, and uniting it with charcoal or carbon in other form and applying fire to desulphurize and desiccate the ore, to extract the precious metal, substantially as described.

65,388.—PADLOCK.—Henry Jackson, Brooklyn, N. Y.

First, I claim the guard, E*, in combination with the tumblers, E, and plate, C, all arranged to operate in the manner substantially as and for the purpose set forth.

Second, The arm, F, in combination with the bolt, D, arranged to operate in the manner substantially as and for the purpose specified.

65,389.—RETORT FOR REVIVIFYING BONE CHARCOAL.—Gustavus A. Jasper, Charleston, Mass.

I claim as my invention, the improvement in the construction of either or both of the two retort sections, A' B' as described, in order that they may be connected by screw bolts, or screws and nuts as set forth, and the upper section, A' be rendered capable of being inserted into and without the lower section, A, by means of the support plates, c d, as explained, each section under such improvement being contracted or made with a neck, h, and provided with cars, e e, or their equivalents, substantially as specified.

65,390.—PLASTER SOWER.—Gilbert Jessup, Shortsville, N. Y.

First, I claim effecting a parallel adjustment of the delivery or discharge plate, G, by means of the bent or anchor levers, h j and k, as set forth.

Second, Hanging the hopper, T, down between the carrier wheels, whereby it is balanced or nearly so upon the said wheels, substantially in the manner and for the purposes herein shown and described.

Third, The combination with the vibrating feed bar, D, having a serrated edge, the agitators, s, when their lower ends are connected loosely to the said bar, D, and the upper end of each alternate one is pivoted to the front side of the box, T, and the others to the rear, as shown and for the purposes specified.

65,391.—BOLT CUTTER.—Jesse Johnson, West Fallowfield, Township, Pa.

I claim the combination of knives, A and B, with levers, E and F, screw, D, frame, C, and top and bottom plates as in figs. 3 and 4, all constructed, arranged and employed in the manner and for the purpose shown and explained.

65,392.—GRATE.—William Keiser, Stroudsburg, Pa.

I claim the arrangement and combination of the parts, B and C, with the frame, A, substantially as described, also the straps, d, and the wrench, D, with the pins, h h' as and for the purposes set forth.

65,393.—MACHINE FOR MAKING PAPER HATS.—Henry Kellogg, New Haven, Conn.

First, I claim the combination of the annular piston carrying the pervious former, with the cylinder, and the means described or the equivalent thereof for controlling the water, substantially as and for the purpose described.

Second, The combination of the elastic couching pad, the annular piston carrying the pervious former and the cylinder, substantially as and for the purpose specified.

Third, The combination of the elastic couch'ng pad, the annular piston carrying the pervious former, the cylinder and the means for stopping the couching pad to compress the fibers, substantially as and for the purpose specified.

Fourth, The combination of the elastic coaching pad, the couching annulus, the annular piston carrying the pervious former, and the cylinder, substantially as and for the purpose specified.

Fifth, The means for automatically controlling the water in the cylinder, of raising and lowering the annular piston carrying the pervious former and the cylinder, substantially as and for the purpose specified.

And finally, the combination of the cylinder, the annular piston carrying the pervious former, the elastic couching pad, and the means for stopping the upward movement of the couching pad, substantially as and for the purpose specified.

65,394.—MACHINE FOR TURNING THE HEADS OF SCREWS.—Timothy Kennedy, Hamden, Conn., assignor to Thomas Kennndy, Branford, Conn.

First, I claim the combination of the cutter holder, B, with the cutter, E' and the cam, F, constructed and arranged so as to operate substantially in the manner herein set forth.

Second, The combination of the segmental cutter, E, having its cutting edge formed as described with the holder, B, said holder being arranged to move the said cutter around a central point into cutting position, substantially as herein set forth.

65,395.—SPRING FOR HOLDING CLOTH IN SEWING MACHINES.—Theodore E. King, Painesville, Ohio.

I claim the tension spring constructed substantially as herein set forth for the purpose described.

65,396.—SKATE.—Geo. V. B. Ladd, Boston, Mass.

First, I claim the combination of the sectional runners as specified with the recessed projection within which they are hinged or pivoted under the arrangement herein described so that the rocking motion of the runners shall be limited and stopped at certain points of the said projection or shoulder as set forth.

Second, The combination of the sectional runners and recessed projections within which they are hinged as described with the elastic foot rest, substantially in the manner and for the purpose set forth.

65,397.—COMBINED COVER LIFTER, HAMMER, ETC.—R. M. Lafferty, Three Rivers, Mich., assignor to himself and J. E. and J. P. Prutzman.

I claim the combination of the screw driver, E, tack drawer, G, lifter, H, hammer head, I, the corrugation, J, of the jaw, F, engaging with the extension piece, K, to form a pincers knife sharpening plate, L, in one implement, constructed as herein described.

65,398.—MAKING CRYSTAL SHRED GOLD FOR DENTISTS.—Emile Lamm, New Orleans, La.

I claim the above process or any other process, substantially the same as specified.

65,399.—METHOD OF PREPARING GOLD FOR FILLING TEETH.—Emile Lamm, New Orleans, La.

I claim the use of all organic substances soluble in solutions of gold with the exception of saccharine substances for making crystallized fibrous gold by any process, substantially the same as that herein described for the purpose set forth.

65,400.—POST HOLE AUGER.—Thomas Leeson, Sharon, Wis.

I claim the combination of the spiral spring plate, C, and nuts, D and E, with each other and with the shank, A, substantially as herein shown and described for the purpose set forth.

65,401.—MEDICAL COMPOUND.— George H. Leithead, East Birmingham, Pa.

I claim a medical compound consisting of water, sugar, borax, gum arabic, laudanum or morphia or other similar opiate with or without alcohol about in the proportions named, and for the purposes above set forth.

65,402.—BEEHIVE.—Volney Leonard, Springfield, Pa.

First, I claim the plate, D, applied to the hive, B, in relation with the holes, g, as shown in combination with the fastenings or pivoted notched plates, j j, substantially as and for the purpose set forth.

Second, The moth trap composed of the grooved and notched strips, h, applied to the hive, substantially as shown and described.

65,403.—CARRIAGE TOP PROP REST.—H. W. Libbey, Cleveland, Ohio.

I claim the metallic sleeve, A, and cushion, B, combined as and for the purpose set forth.

65,404.—EVAPORATOR—Henry Lighty, Attica, Ind.

I claim the skimmer, G, when constructed and operated substantially as herein described and for the purpose set forth.

65,405.—STEAM GENERATOR.—William Lowe, Bridgewater, Conn.

I claim constructing cylindrical boilers commonly known as plain horizontal tubular or flue boilers with one or more openings in the sides or bottom of said boilers which shall communicate with a combustion chamber inside of the boiler, and connected by tubes or flues, with the back end of the boiler through which the products of combustion are made to pass substantially in the manner and for the purposes herein shown and described.

65,406.—SIFTER.—R. C. Ludlow, St. Louis, Mo.

I claim the combination of the batten a, head c, top e, and the sieve b, substantially as and for the purposes herein described.

65,407.—TOURNIQUET CLAMP.—John Lusk, Jr., Eckford, Mich.

I claim the tourniquet clamps (A,) provided with the guide lips (C,) and operated by thumbscrews (B,) substantially in the manner, and for the purpose herein described and set forth.

65,408.—FIRE ESCAPE.—Robert Mackenzie and James Cooper, New York City.

We claim the fire escape consisting of the inclined track ropes, C, C, their upper ends secured to the cross bar B of the window frame, their lower ends to the ground bar D, and forming tracks upon which the car E, slides to the latter, being guided by the cars a, a, fitting around said track ropes and operated by means of the hoisting tackle F, G, b, when all are constructed and arranged as described for the purpose specified.

65,409.—SAFETY VALVES FOR STEAM GENERATORS.—Carlile Mason, Chicago, Ill.

First, I claim the lever C, arranged substantially as and for the purposes specified

Second, The weight supporter D, E, provided with a spring k, substantially as specified.

Third, The catches, l, when so constructed as to remain in position when the weight is elevated by the main lever and so project when the weight is elevated from any cause, substantially as specified.

Fourth, The arrangement of the spring, k, with the lever, C, or their equivalents so as to prevent the escape of steam whenever the weight is agitated from any cause, such arrangement being substantially as specified.

Fifth, The combination of the lever, C, and spring, k, with the lever, B, and weight, F, substantially as specified.

Sixth, the combination of the lever, C, rod or rods, c, and lever, B, with the valve, a, substantially as specified.

Seventh, The combination of the cylinder, D, cap, E, with the spring, k, and rod, h, substantially as set forth.

Eight, The combination of the weight supporter, D, E, provided with a spring, k, and catches l, lever, C, and rod, c, with the lever, B, cylinder, A, valve a, and weight F, substantially as and for the purposes specified

65,410.—RATCHET DRILL.—William Matthews, (assignor to himself and L. W. Eaton,) Bridgeport, Conn.

I claim the combination of the pawl, F, and dog, H, with the ratchet wheel G, when constructed and arranged to operate as herein described and shown,

65,411.—AXLE FOR WAGONS, &C.—F. McManus, Ellenburgh Centre, N. Y.

I claim winding the part of a wooden axle upon which the wheel revolves with metallic wire substantially as herein shown and described and for the purpose set forth.

65,412.—PLOWSHARES.—William D. Mendenhall, Farmington, Ill.

I claim the method of forming or shaping any plowshare or mold board, or both combined, with a concave surface of any desired radius and area, extending from the heel, b, of the plow towards the opposite side (d,) or in a line parallel, or nearly so, to the cut of the share.

65,413.—FELTING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.

I claim the combination of the endless aprons, C C', reciprocating and revolving at different velocities, as and for the purpose described.

65,414.—HANGING WAGON SEATS.—Henry F. Moore and James S. Blaisdell, (assignors to Henry F. Moore,) Medford, Mass.

We claim so attaching the hinges, C, to the body and seat of the wagon that the seat will be allowed to slide back and forth, substantially as and for the purpose described.

We also claim in combination with the above the pins, h, or their equivalents, for locking the seat, B, in place, substantially as set forth.

65,415.—FENCE.—Thomas Morris, McGregor, Iowa.

I claim the panels, A, and braces, C, constructed and combined with each other, substantially in the manner herein shown and described, and for the purpose set forth.

65,416.—FRUIT GATHERER—M. A. Morton and D. F. Morton, Angola, N. Y.

We claim a fruit picker constructed, arranged and operating substantially as herein set forth.

65,417.—CHURN.—John Neal, Sheboygan, Wis.

I claim the combination of the earthenware vessel, A, and the metallic bearing posts, H, substantially as set forth and shown, for the purpose of adapting revolving dashers operated by gearing to an earthenware churn.

In combination with the dashers, F, the stripper, D, substantially as and for the purposes set forth.

In combination with posts, H, and earthenware vessel, A, the hinged cap, h, constructed and operated substantially as set forth.

Connecting the bearing posts, H, to the earthenware vessel, A, by passing a shank of the post through a vertical hole in a suitable lug or projection, and securing said shank by a screw nut, or its equivalent, substantially as set forth.

65,418.—BOILER FEEDERS.—A. F. W. Neynaber, Philadelphia, Penn.

First, I claim the construction of the valve, A, with reference to the orifice of pipe, B, whereby the steam is allowed to flow through pipe, B, for the purpose of blowing an alarm whistle attached to pipe, C, and raising the piston, D, substantially as set forth.

Second, The arrangement of valve, A', piston, D, lever, E, support F, weight, G, pipes, H and I, substantially in the manner and for the purpose as described.

65,419.—PUMP.—William H. Noyes, Franklin, Penn.

I claim the pump herein described constructed with the collar, E', upon the plunger rod, E, valved plunger, C D, and a valve box, G, adopted to be removed by the plunger, C, and forced down into the converging pump barrel, A, by the collar, E', all substantially as and for the purposes herein specified.

65,420.—TIGHTENING AND LOOSENING WHEELS ON SHAFTS.—Leverett H. Olmstead, (assignor to Wright & Smith,) Newark, N. J.

I claim the combination and arrangement of the slide, B, screw y, and pin, or block, X, constructed and operating as described for the purpose of tightening or loosening wheels on shafts, as set forth,

65,421.—CENTER PLATE FOR STOVE TOPS.—P. Paradis and R. Reilly, Rochester, N. Y.

First, We claim dividing the center plates of cooking stove tops transversely through the narrow portion and connecting them by loose or sliding joints, substantially in the manner and for the purpose herein shown and described.

65,422.—CENTERING AND SQUARING CHUCK.—Gardner R. Parker (assignor to Dodge & Wellington,) Worcester, Mass.

I claim the particular combination and relative arrangement of the head, A, slotted thimble, B, drill, a, and cutters, A A', substantially as and for the purposes above described.

65,423.—AUTOMATIC FEEDER OF BOLT BLANKS.—W. F. Parker, Meriden Conn.

I claim beveling the upper and slotted end of the vertically moving bar as described and shown, in order that the screw blanks may by the force of gravity slide off the end of said bar substantially as set forth.

65,424.—PUMPS.—Thomas Patterson, New York City.

First. I claim a pump having an oscillating pistoe, I, within the cylinder, A, which cylinder is provided with a partition or abutment, E, and connected with two channels, c, and d, all arranged substantially as described.

Second, The semicylindrical chambers, c d e and f, provided with the valves, g h i and k, and divided by means of a partition, E, all substantially as set forth.

65,425.—DUROGEL.—Cassius C. Peck and Francis E. Engelhardt, New York City.

First, We claim the use of bichromate of potassa with the addition of mineral acids such as sulphuric or sulphurous acid, and in combination with pentasulphide of calcium, or their respective equivalents substantially as and for the purpose herein set forth.

Second, The use of chloride of lime in addition and combination with common glue substantially as set forth.

65,426.—SUB-SOIL PLOW.—Rufus Peet, Carlile, N. Y.

First, I claim the combination of the parts, E F G H, with each other and with the upright, D, and standard, B, said parts being constructed and arranged substantially in the form and manner herein shown and described and for the purpose set forth.

Third, Operating the reel, P, from the rollers, K, by means of the band, R, and pulleys, S and T, substantially as herein shown and described.

65,428.—AXLE BOX.—William H. Pollard (assignor to James H. Gould), Seneca Falls, N. Y.

I claim the box, A, provided with the corrugations, a a, operating in connection with the hub, as herein set forth.

65,429.—TELEGRAPH SIGNAL KEYS.—Frederick B. Porter, Detroit, Mich.

First, I claim the supplemental point or its equivalent, for the completion of the circuit, O, connected, arranged, and operating substantially in the manner and for the purpose described.

Second, The additional spring, or its equivalent, R, arranged and operating substantially in the manner and for the purpose described, in combination with the above.

65,430.—DREDGING BOX.—G. W. Putnam, Peterboro, N. Y.

I claim the sprinkle, consisting of the vessel, A, having valve, E, and cross partition, D, forming compartments, B C, substantially as described.

65,431.—CHEESE PRESS.—William H. Ragan, Fillmore, Ind., assignor to himself and N. R. Jones, Terre Haute, Ind.

First, I claim the arrangement of the vertical screw, C, in the frame, A A, in combination with the elongated pinion, p, actuating it by means of the spur wheel, p', substantially as and for the purposes herein specified.

Second, The inclined bed, E, provided with level rails, d d, in combination with the platform, h, arranged and operating substantially as and for the purpo es set forth.

65,432.—SHEEP SHEARS.—John Ralston, Slippery Rock, Pa.

First, I claim the cutter, C, when pivoted to the face of the cutter, A, and secured to the spring, B, substantially as and for the purpose herein shown and described.

Second, The stationary notched bar, A, when secured to the spring, B, in combination with the movable cutter, C, which is pivoted to the plate, A, and secured to the slotted end, e, of the opening, B, all as set forth.

65,433.—HARNESS PAD BLOCK.—William H. Rannels, Oakland Mills, Pa.

I claim the bow presser, B, having its legs curved outward and hinged to oblique staples, g g, in combination with the block, A, when constructed as herein specified.

65,434.—POTATO DIGGER.—J. C. Richardson (assignor to himself and William Simpson), Benton, Me.

First, I claim attaching the teeth, D, of the digger directly to the axle, A, of the machine, substantially as herein shown and described.

Second, Operating the digger to lift the potatoes from the ground by means of the lever, J, attached to the axle, A, substantially as herein shown and described.

Third. The combination of the screen, G, and receiving box, H, with the axle, A, and teeth, D, substantially as herein shown and described and for the purposes set forth.

65,435.—PUMP.—F. Richter, Milwaukee, Wis.

I claim the arrangement of cylinder, B, plunger, L, valve chest, C, and valves, H, with the water passages and air chamber, a, as described.

65,436.—PAPER FOR THE MANUFACTURE OF LETTER AND INVOICE FILES.—John L. Rile (assignor to Asa Shipman), New York City.

I claim the preparation of paper and other similar sheets in the manner substantially as described and for the purposes specified.

65,437.—STEAM ENGINE.—Henry F. Roberts, Fayette City, Pa.

I claim the large steam cylinder, D, furnished with a piston and piston rod, and with the pipes, k and m, for admitting and discharging water alternately at its opposite ends, in combination with a high pressure steam cylinder, A, when such cylinders are connected together by chain or steam pipes, f f', substantially as and for the purposes hereinbefore described.

65,438.—FEATHER-CLEANING MACHINE.—J. H. Sardam, Wellington, Ohio.

First, I claim the pipes, E, provided with holes, H, and valve, I, as arranged, in combination with the central pipe, E', and chambers, E F', for the purposes and in the manner as described.

Second, The chambers, F F', and pipes, E E', in combination with the cylinder, A, pipes, G and G', and faucet, R, as and for the purpose set forth.

65,439.—RAILWAY CHAIR—J. W. Shiveley, New York City.

First, I claim the recesses in the rail ends, in combination with a cheek bar which pits into said recesses, substantially as and for the purpose herein shown and described.

Second, I claim the combination of the longitudinal rib, f, its equivalent with the cheek bar, substantially as and for the purpose herein showu and described.

Third, Making the cheek bars, B and B, and central rib, f, one piece, with the chair, C, substantially as and for the purpose herein shown and described.

65,440.—HORSE AND CATTLE POKE.—Nelson Sylvester, Weymouth, Ohio.

I claim the spring, E, plate, F, and spikes, e, in combination with tongue, C, cross piece, D, pin, b, and bow, A, substantially as and for the purpose set forth.

65,441.—BREAD CUTTER.—S. D. Simmons, Brooklyn E. D., N. Y.

I claim the box, A, provided with two compartments, b b', in combination with the knife, B, having the bar, D, attached about at right angles with pivots, e, at its end, to work in bearings, i, and a slit or space, e, allowed at the top of the box for the knife, as it is brought down to work into the compartment, d', substantially as and for the purpose specified.

65,442.—ROLLER FOR BOARDING OYSTER DREDGES.—Thos. P. Sink, Fairton, N. J.

I claim the right and left hand screw roller, as attached to the gunwale of an oyster boat, for the purpose of boarding an oyster dredge, as herein described.

65,443.—MACHINE FOR MARKING CORN GROUND.—George Sprague, Spring Hill, Kansas.

First, I claim the hinged side wings, E E, with wheels, B' B', on their outer ends, combined with the truck frame, A, with wheels, B B, and levers, a a, arranged and operating substantially as and for the purpose described.

Second, The guide rod, d, on the tongue, D, and the measuring line, e, in combination with the truck frame, A, employed as herein described.

65,444.—ENGINE GOVERNOR.—Robert Stewart, Elmira, N. Y.

First, I claim the elliptical springs, E E, and hinges, c c, when attached to cross heads, C D, constructed and operating as described and for the purposes set forth.

Second. The weight balls, G, operating in combination with axes, o, and hinged springs, E, substantially as and for the purposes described.

Third, The combination and arrangement of the hinged springs, E E, and cross heads, C D, hollow shaft, B, and valve rod, A, constructed and operating as described, and for the purposes set forth.

65,445.—MATCH BOX AND CANDLESTICK COMBINED.—Curtis R. Stickney, Hartford, Conn.

First, I claim the combination of a match box and a self-acting candlestick, when formed of two parallel tubes, substantially as herein set forth.

Second, I claim the combination of the tube, c, with the outside shell, d, and the cover, D, substantially as herein described and for the purpose set forth.

Third, I claim the cover, D, having a receptacle for the wick of the candle, substantially as herein described.

Fourth, I claim the placing of the roughened surface, E, in such a position that one of the tubes shall serve as a guide for the match when passed over its surface, substantially as herein described.

65,446.—REVOLVING STAND FOR PICTURES.—Edwin B. Sturdevant, Germantown, Ohio.

First, I claim the rotary frame, g' g', pivoted in the manner described, when arranged upon revolving chambers, substantially as and for the purpose specified.

Second, The series of revolving chambers furnished with brackets, h h, and arranged to exhibit two or more tiers of rotary double picture frames, substantially as and for the purpose specified.

65,447.—LIFTING JACK.—Seman Taber, St. Joseph, Mo.

I claim the construction and arrangement of the pawls or dogs, F I, springs G M and I, levers, H, lifting hook, D, rack bar, B, and socket, K, in the handle, L, substantially as described for the purpose specified.

65,448.—FIRE KINDLER.—Verlin G. Tansey, Quincy, Ill.

I claim an improved fire kindler, constructed and arranged substantially as herein shown and described and for the purposes set forth.

65,449—VISE FOR HOLDING WOOD.—Isaac C. Tate, New London, Conn.

I claim the universal joint, D, constructed as described, consisting of the shank, A, arm, B, to which the cup lever, C, is pivoted, and adjusted by means of the set screw, b, adapted to support and adjust the ball, G, in any desired position, substantially as described for the purpose specified.

65,450.—WINDLASS FOR VESSELS.—Henry Thompson, Rockland, Me.

I claim as my invention the arrangement as well as the combination of the vibratory standard, F, and its roller, c, or the equivalent thereof, with the windlass, A, and one of its pawl cases, C C, so as to be operated by such pawl case, substantially in the manner and for the purpose as hereinbefore specified.

I also claim the combination and arrangement of the vibratory standard, F, its roller, c, or the equivalent thereof, the stay, G, and the connection bar, d, as described, the whole to be applied to the deck and windlass of a vessel, and the pawl case of such windlass of a vessel, substantially as and for the purpose hereinbefore explained.

65,451.—VENTILATING DOOR.—Theodore R. Timby, Saratoga Springs, N. Y.

I claim ventilating rooms by means of the holes, a, or slats, a', at the top or bottom of doors, provided upon each side with beveled or hollowed out deflectors, B or B', immediately above the said holes and projecting over them, substantially as herein shown and described.

65,452.—MOTOR REGULATOR AND REGISTER ATTACHMENT FOR ORGANS.—William H. Topham (assignor to himself and Peck, Brothers & Co.), New Haven, Conn.

First, I claim the combination of the plates, K K, with the plug, G, and cylinder, D, of the valve, substantially in the manner and for the purpose herein set forth.

Second, in combination with the plug, G, and its spindle, H, and bearing, I, the cap, h, and the nut or nuts upon the spindle, substantially as and for the purpose set forth.

Third, The combination of a regulator valve with an organ register, V, when constructed and arranged so as to operate substantially in the manner set forth.

Fourth, The combination of the rod, W, the register, V, and the rod, R, with a regulator valve and the bellows, when constructed and arranged so that the register operates substantially as set forth.

65,453—STEAM ENGINE.—J. F. Troxel, Bloomsville, Ohio.

First, I claim the special arrangement of the pistons, B B' B'', rods, C C', cross heads, G, and links, F, in combination with the lever, D, link, H, and crank wheel, I, for the purpose and in the manner substantially as described.

Second, The sliding valve, a, as arranged in combination with the pistons, B B' B'', and operated in the manner as and for the purpose herein substantially set forth.

65,454.—MAKING CAR WHEELS.—Samuel Vanstone (assignor to himself and John Stuart, Providence, R. I.

I claim constructing a car wheel by first forging or stamping the part, B, with the lugs, C, around the central hole, b, and then casting the hub thereon, substantially as described.

65,455.—FELTING MACHINE.—Enoch Waite, South Natick, Mass.

I claim the combination of the card cylinder, the feeding mechanism, the carrying aprons, and one or more felting tables, and the plates or platens thereof, working longitudinally of the machine, the whole being arranged substantially as described.

I also claim the combination of the transversely-grooved roller, N, the card cylinder, the carrying aprons, and one or more sets of felting beds or platins, arranged substantially as and so as to operate as specified.

I also claim the combination of one or more sets of felting platens, and mechanism for moving them transversely to the sheet of felt, with one or more sets of such platens and their mechanism for moving them longitudinally of the sheet of felt, the whole being substantially as and for the purpose as hereinbefore described.

I also claim the combination of the feeding mechanism, the card cylinder, the two endless apron, the beds, and longitudinally and transversely-working platens, provided with machinery for operating them, substantially as described.

65,456.—MACHINE FOR FORMING BATS FOR FELTING WADDING, ETC.—Enoch Waite (assignor to himself and the Elliott Felting Mills), Franklin, Mass.

I claim the combination of the endless apron, C, and the feeding drum, I, of the auxiliary carding engine, by or with mechanism, whereby the speed of the said drum may be controlled by, or increased or diminished with that of the apron, substantially as and for the purpose specified.

I also claim the endless carrier and the striker made and arranged in manner and provided with mechanism for operating them, as described.

And I also claim the combination of the projections of the striker to their bars by hinges, or mechanical equivalents therefor, in order that the projections may vibrate or move relatively to the bars, so as not to impede the motion of the apron.

I also claim the combination of the endless apron, C, the feeding drum, I, and the doffer, H, by or with mechanism whereby the speeds of both the drum and doffer are varied with that of the endless apron, the same being for the purposes or objects explained.

65,457.—KILN FOR RE-BURNING AND PURIFYING BONE BLACK.—Adam Weber, New York City.

First, I claim the columns, A', having cast upon their upper ends the plates, s, in combination with the angle plates, p p, supporting the fire bricks, q q, the bed plates, a a, and ash pan, L, substantially as described for the purpose specified.

Second, The arrangement of the inclined partitions, h h, between the single retorts, D D, and cast upon them and between the fire spaces, k k and m m, in the rear, substantially as and for the purpose specified.

Third, The horizontal fire flues, K K', and dampers, n n, in combination with the retorts, substantially as described for the purposes specified.

Fourth, The hanging rods, c, extending in sections from front to rear under the coolers, and suspended from the plates, a, by means of the hangers, d, arranged to support a series of retorts, as herein set forth for the purpose specified.

Fifth, The suspended iron ash pan, L, in combination with the furnace, C, substantially as described for the purpose specified.

Sixth, The flanges, v, cast upon the upper ends of the lower sections of the retorts, D, and formed in such a manner as to form partitions between the upper retorts and lower retorts, E and E', substantially as described for the purpose specified.

65,458.—APPARATUS FOR THE MANUFACTURE OF VINEGAR.—Wendelin Weis, St. Paul, Minn.

I claim the vinegar apparatus which is constructed so that the vinegar and the air pass in zigzag lines over and around shelves, B, in opposite directions to each other, which is provided with hot and cold air pipes, and with the movable end boards or such that can be opened, all substantially as and for the purpose herein shown and described,

65,459.—LAMP BURNERS.—Abel Whitlock, Danbury, Conn.

I claim the flexible strap, B, in combination with the screw, F, or its equivalent for the purpose set forth.

65,460.—PLATE LIFTER.—John B. Willett, West Meriden, Conn.

I claim the combination of the handle, A, the lever, D, and hooked arms, C, three or more constructed and operating substantially in the manner as herein set forth.

65,461.—COFFEE POT.—Edward F. Woodward, Brooklyn, N. Y.

I claim the detached fountain percolator constructed as described consisting of the taper metal tube, A, upon the inverted cup, B, and supporting the cylindrical cup, C, with the perforated bottom, through which the taper tube, c, passes, tube l, cap D, with the perforated plate, g, tube, E F, branch tubes, h', cup top, F, and cover k, combined and operating substantially as described for the purpose specified.

65,462.—APPARATUS FOR DESTROYING MOTHS.—Charles F. Worch, New York City.

First, An apparatus for destroying moths that is made and operated substantially as herein shown and described.

Second, The device for regulating the heat in the box, A, consisting of the box, E, pipes, G and H, dampers, a a and c, and door, F, all made and operating substantially as shown and described.

Third, the use of air-tight boxes in which racks or shelves, B, are arranged for holding furniture and clothing from which all the moisture is removed without an excessive heat.

65,463.—STEAM ENGINE LUBRICATORS.—John Ashcroft, New York City.

First, I claim the lid, or cover, (B) constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

Second, The combination of cover, (B) and cup (A) constructed, arranged and operating in the manner substantially as shown and described and for the purpose set forth,

65,464.—PRESSES.—Henry B. Barber, Scott, N. Y.

I claim the sliding plate, C, with its palls, a c, and eccentric lever, D, when used in combination with the rack bar, B, and follower, D, and frame, substantially in themanner and for the purpose set forth.

65,465.—PIPE AND STUD WRENCHES.—Joseph B. Barnes, Fort Wayne, Ind.

First, I claim the handle, (a) when the back portion of the upper end shall be provided with a rack in combination with jaw (e) as and for the purpose specified.

Second, The pawl, (d) spring, (e) all combined and operated as and for the purpose described.

65,466.—LIGHTING GAS BY ELECTRICITY.—E. E. Bean and W. H. Mumler (assignors to themselves and Nathaniel Cummings), Boston, Mass.

First, We claim, in combination with the escape wheel, p, the arm, n, rock shaft, r, and the detent, e, when constructed and operated in the manner substantially as described.

Second, We also claim the non-conducting sleeve, H, having the wires, l m, imbedded therein, in combination with the tip of the burner, substantially as described.

Third, We also claim imbedding the wires, l m, in a sleeve, H, of non-conducting material, surrounding the tip of the burner, or in the non-conducting tip of the burner itself, substantially as and for the purpose set forth.

65,467.—LAMP CHIMNEY.—John Bellerjeau, Philadelphia, Pa.

First, I claim the metal chimney, E, when supported by upright bars, D, and secured to an annular plate, C, substantially as and for the purpose herein shown and described.

Second, A lamp chimney consisting of the lower glass or transparent chimney, F, and an upper metal chimney, E, which are so arranged that the same do not come in direct contact with each other, substantially as herein shown and described.

Third, The glass chimney, F, in combination with the metal strips or bars, D, arranged inside of the glass chimney substantially as herein described, for the purpose specified.

65,468.—TOILET POWDER.—Innocent Antony Bergrath Nashville, Tenn.

I claim the manufacture of this particular toilet powder, and from the material as herein set forth.

65,469.—STONE CHANNELING MACHINE.—Virgil W. Blanchard, Bridport, Vt.

First, I claim the employment of a hinged frame when used substantially as and for the purpose set forth.

Second, The employment of one or more chisels, or one or more saws, to which a rotary motion is given for the purpose of channeling petrous substances, when attached to a hinged frame, substantially as described.

Third, The employment of a hinged frame to which are attached an elevating arm or arms and springs, as and for the purpose specified.

Fourth, The employment of a feed apparatus in combination with a hinged frame, substantially as and for the purpose described.

Fifth, The tooth rack, I, on the track upon which the frame rests, in combination with said frame, substantially as set forth.

Sixth, I claim further the employment of the lever, I, cog wheel, H, when used as and for the purpose specified.

Seventh, In combination with the above I claim the screw shaft, E, substantially as and for the purpose set forth.

65,470.—ROTARY VALVE FOR STEAM ENGINES.—P. Bloomsburg and J. Molyneux, Bordentown, N. J., assignors to Bordentown Machine Company.

First, We claim a rotary valve composed of the disk, F, with its passage, f, and opening, h, and the disk, D, with its opening, t, in combination with the within described ported face of the valve face of the cylinder, and the intermediate disk, E, with its openings, j and j', the whole being constructed and operating substantially as and for the purpose herein set forth.

Second, The disk, F, and spindle, G, with its vertical slot, g, in combination with the disk, D, the tubular spindle, H, and its spiral slot, and the adjustable collar, I, the whole being arranged for altering the relative positions of the said disks, substantially as set forth.

65,471.—APPARATUS FOR STACKING HAY AND GRAIN.—Wm. F. Browne, Washington, D. C.

What I claim as my invention and desire to secure by letters patent is the combination and arrangement of the elevated sheltering platform, the mast with its elevating crane, and the ladder for ascending the mast or stack, substantially as and for the purposes herein specified.

65,472.—TREMOLO ATTACHMENT FOR MELODEONS, ETC.—R. W. Carpenter, Brattleboro, Vt.

I claim the attachment to a melodeon or other wind instrument of like character, of a rotary tremolo valve or swell, constructed to form an intermittent cut-off to the current and arranged to control the same in its action on the reeds, substantially as specified.

65,473.—MAKING STEEL DIRECT FROM ORE.—Thomas J. Chubb, Brooklyn, N. Y.

First, I claim treating purified iron sands or mechanically purified ore, by preparing, mixing, forming, or packing it into lumps, balls, or cylinders, and afterward deoxidizing, carbonizing, melting, casting, and hammering or rolling the same at one or continuous though varying heat, substantially as described.

Second, The combination of the furnace, A, with the melting pot or chamber, A', constructed and arranged for deoxidizing, carbonizing, converting, and melting iron ore or metal having some of the properties of steel, substantially as described.

Third, Preparing, mixing, and forming iron ore into lumps, balls, or cylinders, and packing the same into casings made of clay, cast or sheet iron, or any suitable material, for the purpose or purposes specified and substantially as described.

Fourth, The employment of a long, narrow nearly horizontal or slightly inclined chamber, A, so constructed that ore, in the form of lumps, balls, or cylinders may be fed in at one end of the said chamber or furnace, and discharged at the other end in the form of steel sponge, chemically changed as to the volatile matter combined with or contained in the said ore or metal, substantially as described.

Fifth, The employment of a long narrow chamber, A, so constructed that it may be opened or closed at either end by gates or their equivalents, for the admission of the substances to be melted or converted into cast steel or similar metal, and for the admission and discharge of air and gases, and for manipulating the same or otherwise the substances under treatment therein, said chambers being also provided with a tap hole, and suitable movable partitions, or their equivalents, substantially as described.

Sixth, The employment of a mold chamber, H, in combination with a melting chamber, A', substantially as and for the purposes described.

Seventh, Converting purified iron sands or mechanically purified iron ore in to steel sponge or into a deoxidized spongy mass, by aid of a gas or gases arising from a gas generator when the same is passed through a reheating operation, substantially as described.

Eighth, The employment of a gas generating furnace or apparatus, or passage leading therefrom, a gas and air heating or a heat reclaiming or regenerative furnace and apparatus with a chamber or chambers employed for chemically changing the volatile matter combined with iron ore, or iron sponge, substantially as described.

Ninth, The combination of a gas generating furnace or passage leading therefrom and a reheating or regenerating furnace, and apparatus with a mold chamber, H, for the purpose of heating or reheating in a chamber, the mold or ingot or casting therein, for the purpose or purposes specified and substantially as described.

Tenth, The employment of intensely heated molds for casting ingots therein, when employed for retaining the heat in the castings preparatory to and for hammering or rolling the same, substantially as described.

Eleventh, The employment in a heated mold while casting or pouring the melted metal therein, of gas or gases for excluding the atmospheric air therefrom, substantially as described.

Twelfth, The combination of a gas generating furnace, or apparatus operated in connection with a gas and air heating or a heat regenerating apparatus, with a deoxidizing and carbonizing furnace or chamber for the purpose of heating the same, substantially as described.

Thirteenth, The combination of a gas generating furnace operating in connection with a gas and air heating or a heat regenerating apparatus, with a deoxidizing and carbonizing furnace or chamber, for the purpose of heating the same, substantially as described.

Fourteenth, The combination of a gas generating furnace operating in connection with a gas and air heating or regenerating apparatus with a melting chamber, or pot employed for melting or reducing steel sponge and deoxidized sponge or carburet of iron in the form of sponge into cast steel or metal similar to or having some of the properties of cast steel, substantially as described.

Fifteenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with a stationary chamber for deoxidizing magnetic proto or per oxide of iron containing or not the oxide of tetanium or other metal or reducing matter.

Sixteenth, The combination of a gas generating furnace or apparatus, or the passage leading therefrom, with a stationary chamber for reducing, heating, or melting of deoxidized sponge or ore in the form of sponge.

Seventeenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with a chamber for heating molds or the castings in the chamber in which they are formed.

Eighteenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with reheating tubes or a chamber containing heated tubes constructed or adapted to the deoxidizing, heating, melting, or reduction of ores or metallic substances containing iron and in the form of sponge, before, during, or after such treatment or treatments, substantially as described.

Nineteenth, The employment of a heat reclaiming or a heat regenerative furnace or apparatus in combination with a chamber employed for heating a vessel or crucible containing iron ore or metallic sponge, converting, cementing, and melting the same into steel.

Twentieth, The combination of a heat reclaiming or heat regenerative furnace or apparatus with a stationary vessel or chamber or chambers employed for converting, melting, and cementing steel or metallic substances into steel.

Twenty-first, The immersion of steel sponge, or carburet of iron sponge, into a bath of molten steel or metal similar in nature or quality to the sponge, so that the sponge may be melted and also a homogenous liquid mass formed of it and the metal constituting the bath, substantially as described.

65,474.—COFFEE CAN AND CRUSHER.—Daniel C. Colby, Washington, D. C.

I claim combining with a coffee canister a grinding or crushing device of any desired structure, substantially as described and set forth.

65,475.—BEVERAGE.—Wm. Davis, Portland, Me.

I claim the compound of ingredients herein specified for a beverage, as set forth.

65,476.—CAN AND BOX FOR PAINTS, ETC.—Frederick W. Devoe, New York City.

I claim the groove, a, external rib, b, and gasket, c, arranged in relation with each other and with the upper part, a*, of the body, A, and the rim, b*, of the cover, substantially as herein set forth for the purpose specified.

65,477.—CAN OR BOX FOR HOLDING PAINT.—James F. Drummond, New York City.

I claim, First, The circumferential groove, a', in combination with the overlapping rim, d, of the cover, and the soldered joint, a', substantially as herein set forth for the purpose specified.

Second, The external circumferential rib, b, arranged with reference to the groove, a, rim, d, and soldered joint, a', substantially as herein set forth for the purpose specified.

65,478.—HAY LOADER.—Wm. H. Elliot, New York City, assignor to Lowell L. Johnson, Binghamton, N. Y.

First, I claim the combination of the swinging frame, g, or its equivalent, a lifting rope, m, and an elevating fork, so arranged that the loaded fork will operate the frame to produce the necessary friction to raise the load while said frame will drop, and the elevating mechanism cease to act, when the fork is unloaded.

Second, The combination of the lifting rope, m, swinging frame, g, pulley, h, belt, k, and tightening pulley, l, arranged and operating substantially as described.

Third, The stop, m', upon the rope, m, in combination with ring, n', and swinging frame, g, for the purpose of decreasing the friction at the proper moment, so as to hold the fork suspended, as set forth.

Fourth, Constructing a tripping fork so that it may be released for the discharge of the load by simply turning its handle and pressing against the same.

Fifth, The combination of the spring catch, r, head, p, and handle of the fork, substantially as and for the purpose set forth.

65,479.—STEAM GENERATOR.—Henry Feyh (assignor to himself, George T. Emery, and Wm. B. Hawkes), Columbus, Ohio.

First, I claim the arrangement of inclined pipes or cylinders of different diameters or capacities, communicating as described, for the purpose of producing a forced circulation of water in all parts when exposed to the action of heat, substantially in the manner described and shown.

Second, The arrangement of pipes, G and H, with pipes, D and E, the end of said pipes projecting outside of the furnace walls, substantially as and for the purpose described.

Third, The arrangement of ball couplings, J, and pipes, G G H, said pipes being of different diameters and in communication with one another by means of the chamber on which the ball joint seats for the pipes are formed, substantially as and for the purpose herein described.

Fourth, A steam superheater, A, in conjunction with a steam generator operating upon the principle substantially as specified.

Fifth, A steam receiving chamber, B, in combination with a series of pipes of different diameters connected together at their ends and arranged substantially as described.

Sixth, The combination of pipes, G and H, with pipes, D E, substantially in the manner and for the purpose described.

65,480.—MACHINE FOR HULLING RICE.—Edmond Theodore Ganneron, Paris, France.

First, I claim the arrangement of the suction chamber, I, and its nozzles or passages, H, with relation to the cylinders, C D F G, for operation substantially as specified.

Second, The valve, N, in combination with the chamber, I, for regulating the draft through the passages, H, without varying the velocity of the fan or other device producing the suction.

65,481.—APPARATUS FOR ANNEALING WIRE.—Henry C. Gee, New York City.

First, I claim the fluted chambered cylinder, A, with hollow journals, B B, perforated pipe, E, and jacket, C, all arranged and operating substantially in the manner and for the purpose set forth.

Second, I claim in connection with the above the annular, i i, in the cylinder, A, and the stationary fingers, c c, substantially as and for the purpose herein described.

65,482.—STUMP EXTRACTOR.—Hugh M. Gibson, Grand Rapids, Mich.

First, I claim the arms, C C, lever, A A, connecting bars, B B, and pawls, O O, all being combined, arranged, and operating as and for the purpose specified.

Second, The roller, D, hooks, G G, ratchet wheels, K K, pawls, O O, and arms, C C, when all arranged and operated as and for the purpose described.

65,483.—ROTARY STEAM ENGINE.—J. E. Gillespie, Boston, Mass.

First, I claim the combination of the sliding and revolving radial wings or pistons and loose eccentric rings, E, for operation together essentially as specified.

Second, The loose eccentric rings, E, made adjustable from the exterior of the cylinder or case, substantially as herein set forth.

Third, The blocks, a, to the wings or pistons, F, made adjustable from the outside of the cylinder or case, essentially as described.

65,484.—CONSTRUCTION OF PIERS, DOCKS, AND WHARVES.—Richard A. Gilpin, Chester County, Pa.

I claim the construction, arrangement, and combination of the piles, a a, plates, b b, ties, d d, and walls, h h, in the manner and for the purpose herein described.

65,485.—SOAP FOR CLEANING AND POLISHING WOOD, METALS AND OTHER MATERIALS.—J. T. Greenwood and J. Wilson, Beloit, Wisconsin.

We claim a new article of manufacture—an improved soap for cleaning painted work and polishing metals, tin, gold, silver, and plated ware, composed of the ingredients herein stated in about the proportions specified for the purpose set forth.

65,486.—WINCH OR CAPSTAN.—John L. Heald, Boston, Mass.

First, I claim a roller, L, when employed in connection with the drum, C, of a winch or capstan, substantially as and for the purpose set forth.

Second, Supporting the shaft of the roller, L, in sliding bearings, R, operated by levers, K, or their equivalents, substantially in the manner and for the purpose described.

Third, The lateral gearing, F, in combination with the pinion, E, on the crank shaft, D, for reducing the speed of the revolution of the drum, C, of the winch, as and for the purpose specified.

Fourth, In combination with the above, the gears, H I, for ensuring the simultaneous revolution of the shafts, B J, substantially as set forth.

65,487.—BOOT HEEL.—Louis Hoffman and Augustus A. Hoffman, Buffalo, N. Y.

We claim the connecting plate, C, constructed and applied as described, and provided with the spurs, f f, in combination with the screw, e, and reversible or removable outer portion, A, of a heel, arranged and operating substantially in the manner and for the purpose set forth.

65,488.—CHURNS.—James C. Jay and Joseph Younce, Wabash, Indiana.

First, We claim the devices for giving motion to the dasher in combination with the chair.

Second, Utilizing and applying the power of the rocking-chair in motion, and its easy and convenient motion for the purpose of churning.

65,489.—WRENCH.—Lucius Jordan, Southington, Connecticut.

I claim the arrangement of the bar, A, sleeves, D and E, nuts, F and H, and handle, G, the several parts being constructed and arranged in the manner and for the purpose herein specified.

65,490.—GAS CHAMBER AND VALVE FOR FORGES.—John V. Karr, Goshen, Ind.

I claim the box, A, made of any suitable shape and provided with an inlet and outlet pipe and air opening, E, when used with the valve, D, constructed and applied as and for the purpose specified.

65,491.—MACHINE FOR CUTTING THE LOCKS IN HOOPS FOR BARRELS.—F. C. La Riviere (assignor to Lucian D. Newall and Moses R. Greely), Minneapolis, Minnesota.

I claim the use of the lever, E, when constructed and operated to automatically clamp the hoop while the knife cuts the lock, in the manner and for the purposes substantially as set forth.

65,492.—SHOE.—Charles D. Letherburg, Chester, Pa.

I claim the within covering for the foot, consisting of the parts, B and C, and the flap, D, when cut of two pieces of material arranged as described.

65,493.—COOKING STOVES.—B. F. Livingston, Chicago, Ill.

I claim, First, The openings to the grate and the oven arranged in the top of the stove, substantially as and for the purpose set forth.

Second, The combination of the plates, C F, with standards, H, forming a double oven door, as and for the purpose set forth.

Third, The arrangement and combination of the ash pan, R, fire box, Q, and draft flue, P, with the oven door, O, substantially as described and set forth.

65,494.—COMPOSITION OR PASTE FOR ARTICLE OF FOOD.—Robert M. Livingston, Mobile, Ala.

I claim a cheese compound or paste substantially as above described.

65,495.—PADDLE WHEEL.—Elisha Matteson, South Brooklyn, N. Y.

I claim the use of two sets or series of paddles inclining inward, and arranged to gather and discharge the water, while they are made of gradually increasing and decreasing length to correspond with the increasing and decreasing power of the crank, substantially as herein specified.

65,496.—CHURNS.—William R. McCutcheon, Washington, D. C.

I claim, in churns where there are two shafts rotated in opposite directions, the wheel dasher having the inclined faces on the one shaft and below the perforated dasher, having its inclined faces on the other shaft, the two being operated as and for the purposes herein set forth.

5,497.—SPIKES.—George W. McGill, Washington, D. C.

I claim a split spike having one prong longer and larger than the other, and the smaller and shorter prong so bevelled at its point that one being driven into the wood it will diverge and spread from the main prong so as to operate as a brace and barb, substantially as and for the purpose described.

65,498.—ATTACHING THILLS TO CARRIAGES.—Charles D. Miller, (assignor to himself and C. H. Warner), West Meriden, Conn.

I claim, first, The combination and arrangement of the bar, b, extending between the heads, E, with the socket, C, and pivot, D, each constructed with a slot their entire length to receive the bar, b, and so as to operate substantially in the manner herein set forth.

Second, The arrangement of the groove, h, on the pivot, D, and the pin, e', in combination with the socket, C, substantially as and for the purpose specified.

65,499.—BAG FASTENERS.—James Miller, Ovid, Mich.

I claim the piece of sole leather or other substantial material, a, the leather strings or other strong cords, B and b o, and the iron hook, c, combined and arranged substantially as described.

65,500.—APPARATUS FOR CHARGING SODA FOUNTAINS.—Daniel Needham, (assignor to himself and Jesse A. Locke and C. M. Hovey, Groton, Mass.

I claim the tube, B, or its equivalent for containing one of the gas producing ingredients, operated in the manner substantially as described, in combination with the casing, A, of a fountain for soda and mineral waters, and other effervescing beverages, substantially as set forth.

65,501.—MACHINERY FOR FORMING MOLDS FOR STEREOTYPE OR ELECTROTYPE PLATES.—M. Nelson, New York City.

First, I claim communicating motion to the lever that impresses the types by an end motion of the pulley, 9, when the cylinder, c, is stopped, substantially as set forth.

Second, I claim the lever, h, incline, i, and sliding pulleys, 9, in combination with the key barrel, l, substantially as set forth.

Third, I claim the projection, 19, swinging frame, 20, with diagonal cam, 21, actuating the lever, p, in combination with the spacing block, q, the parts being arranged and acting substantially as set forth.

Fourth, I claim the auxiliary carriage, l', in combination with the beds, k and levers, 31, and table, m, substantially as and for the purposes set forth.

Fifth, I claim the scale boards, 26, keys, 35, and levers, 31, in combination with the auxiliary carriage, l', as and for the purposes set forth.

65,502.—SKATE.—John W. Post, Castile, N. Y.

First, I claim the screw buttons, e e' f' g', arranged substantially as and for the purposes described.

Second, The spring bar, i, provided with a lug, h, passing through a hole, c2, in the top part of the runner, B, substantially as and for the purposes described.

Third, The combination of the spring bar, i, provided with a lug, h, with the screw buttons, e' f' g', and plates, a' and d, provided with slots, a2 b1 and c1, substantially as and for the purpose described.

65,503.—BUTTON.—Joseph M. Prugger, New York City.

I claim a button having a shank whose base, a, is concave, in the center of which is secured at an obtuse angle the wire coil, c, whose convolutions are in the same plane with the base, whereby the button is uniformly supported while holding the cloth clamped in the concavity of the base, substantially as described.

65,504.—ICE CRUSHER.—Edward F. Pryor, Dayton, Ohio.

First, I claim the ice chamber, B, when provided with the chambered cover or extension, A, for containing the toothed plunger, D, and perforated diaphragm, F, either with or without the hinge, C, constructed substantially as described and set forth.

Second, The perforated diaphragm, F, or its equivalent, when arranged for use in an ice crusher, substantially as and for the purposes specified.

65,505.—WATER CLOSET.—Andrew Rankin, New York City.

I claim the pan or dish, D, and perforated receptacle, E, in combination with a water closet bowl, A, all arranged together and operating substantially as and for the purpose described.

65,506.—COG GEARING SPRING.—Jonah L. Rees, Peoria, Ill.

I claim the hub, D, with its arms, E, rubber spring, G, adjusting bolt, I, and tightening tap, L, of their equivalent, in connection with the arms, F, of bevel wheel, A, working in the manner and for the purpose specified.

65,507.—PETROLEUM VAPOR STOVE.—J. J. Riddle and W. S. Gray, Pittsburgh, Pa.

First, We claim a coiled, curved, or other ordinary shaped continuous conduit heater, F, within the flame and of sufficient length to vaporize any of the different grades of petroleum oils in combination with foraminous cap, E, and mixing chamber, H, for the uses and purposes mentioned substantially as described.

Second, We claim the carrying of water from a vessel, R, into the flame, in chamber, F, by means of tube, W, filled with any ordinary capillary substance, d, for the uses and purposes mentioned substantially as described.

Third, We claim the carrying of steam from a closed vessel, C, by means of tube, S, into the flame in chamber, F, for the uses and purposes mentioned substantially as described.

Fourth, We claim the carrying of water into the cold oil from a vessel, E, by means of the capillary substance, d, and tube, h, for the uses and purposes mentioned substantially as described.

65,508.—SASH FASTENER.—Amos C. Rodgers, Philadelphia, Pa.

I claim a sliding frame or door, B, with its plate, b, at the edge in combination with a plate, a, and with screw, D, whereby the plate, F, may be brought firmly against or removed from contact with the plate, b, the whole being constructed and operating substantially as and for the purpose described.

65,509.—BREECH-LOADING FIRE-ARM.—Matilda C. Root and Elisha Colt, Hartford, Conn., and Harris Colt, New York City, executors of E. K. Root, deceased.

First, We claim the employment in construction with the open breech barrel and frame of a sliding breech piece, constructed and arranged to operate in the manner substantially as set forth.

Second, We also claim the extractor shoe or piece in combination with the sliding breech piece and the frame in which both said parts work, arranged and operating substantially as set forth.

Third, We also claim the double-acting spring, S, in combination with the seer, E, and catch bar, T, the whole constructed to operate substantially as set forth.

Fourth, We also claim the hammer, M, constructed as described in combination with the sliding rod or bar, w, and check pin, n, substantially as described for the purpose set forth.

65,510.—REVOLVING FIRE-ARM.—Matilda C. Root and Elisha Colt, Hartford, Conn., and Harris Colt, New York City, executors of E. K. Root, deceased, assignors to Colt's Patent Fire-arm Company, Hartford, Conn.

First, We claim the employment in combination with a removable breech block or cylinder of a vibratory base pin, substantially as and for the purpose set forth.

Second, The employment in combination with a rotatory base pin of a cylinder bored through when the whole is so constructed and arranged that the cylinder can be moved in the said base pin and engage therewith with either end forward, as and for the purpose set forth.

Third, The employment in connection with the stock barrel and a swinging cylinder of a frame, A', of the same shape substantially as described so as to permit the removal and replacement of the cylinder, in the manner set forth.

65,511.—STEAM GAGE COCK.—James Sanders, East Boston, Mass., assignor to himself and Noah H. Marston, Boston, Mass.

I claim the hollow conical plug, B, with its spindle, C, and opening, d, in combination with the shell or casing, A, the interior of which is of a tapering form, all arranged and operating substantially as and for the purpose set forth.

65,512.—COMPOSITION FOR CONVERTING IRON INTO STEEL.—Thomas Sheehan, Dunkirk, N. Y.

I claim the saturation of the liquid combination described in my former patent with carbonic acid gas, substantially for the purpose set forth.

65,513.—CAR COUPLING.—G. W. Shingleton, Auburn, N. Y.

First, I claim the levers, k k, in combination with the treadle, B, operating substantially as and for the purpose set forth.

Second, The springs, n n, when operated upon by levers, k k, as and for the purposes described.

Third, The pivoted connecting pin when constructed and used substantially as and for the purpose described.

65,514.—LIFTING JACK.—Tilman Shiver, Newburgh, Ind.

I claim the construction and arrangement of the laterally vibrating bar, C, pivoted at its lower end to the part, B, and at its upper end to the lever, G, which is pivoted to the part, A, of the jack, the said parts, A and B, being recessed as at c d, substantially as and for the purpose described.

65,515.—FILTER FOR PHARMACEUTISTS AND OTHERS.—A. B. Spencer, Rochester, N. Y.

First, I claim in an atmospheric filter composed of the tunnel, A, bottle or jar, B, and air pump, C, the employment of a packing, h, for the purpose of producing an air tight joint between the tunnel and bottle, the whole combined and arranged as herein set forth.

Second, The arrangement of the filtering medium, d d, with the removable perforated diaphragm, f, when operating in connection with the shoulders, c c, as herein set forth.

65,516.—FURNACE FOR HEATING ARTICLES OF STEEL IN THE PROCESS OF TEMPERING.—Benjamin S. Stokes, Manchester, N. H.

I claim the cellular muffle, K, substantially as and for the purpose set forth.

I also claim placing the flue, C, at or near the front of the furnace for the purpose described.

I also claim forming an air space, g, within the door, F, substantially as and for the purpose set forth.

I also claim the cellular muffle, K, in combination with a furnace provided with a flue, C, and a double door, F, constructed and operating substantially as described.

67,517.—SAWING MACHINE.—J. B. Sweetland, Pontiac, Mich.

I claim the arrangement of lever, P, with the cord, S, box, d, and pin, q, and shaft, M, for raising the saw and throwing the roller in gear to move the timber at the same operation, substantially as set forth.

65,518.—RAILWAY SWITCH AND SIGNAL.—George L. Warner (assignor to himself and Cornelia Hawks), Rochester, N. Y.

I claim the combination and arrangement with the switch, B C, of the elevated and isolated signal, L, connected by the cord, c, and provided with counterbalance weight, f, operating in the manner and for the purpose specified.

I also claim specially heating the cam shaft, G, in the ends of the shifting rails and providing it with cams that couple the ends of the rails directly together, as herein set forth.

I also claim the arrangement as a whole consisting of the weighted signal, L, cord, c, switch, B C, cam shaft and cams, G a a, and the standard frame, I K, with guide, b, and screen, g, as set forth.

65,519.—FARM GATE.—James B. Webb, Muscatine, Iowa.

I claim the combination of the gate, A, post, B, adjustable head piece, C, with the rods and levers, D E F and F' and double crank rods, G and G' arranged to operate substantially in the manner and for the purpose set forth.

65,520.—FOLDING CHAIR.—George E. Whitmore, Housatonic, Mass.

I claim the combination of the arm posts, B, straps, D, and headers, A, with their stop pins and slots, G, constructed and arranged in a folding chair in the manner and for the purpose set forth.

65,521.—HUB FOR WHEELS.—G. E. Whitmore, Housatomic, Mass.

I claim the combination by which the the wooden parts of the hub is encased and supported at both ends and on its periphery by the iron flanges enabling the wooden spokes to drive the spoke firmly into the smallest hub and thus attaining the desired qualifications of elasticity and strength.

65,522.—BEEHIVE.—A. T. Wright, New Vienna, Ohio.

First, I claim the honey frames, R, and broad frames, R', as constructed when used in the manner herein specified, with the triangular strips, a3, for closing the openings between the frame sections, F F', as set forth.

Second, The construction and arrangement of the bars, G, pieces, K, and eccentrically tenoned locks, L, with the frame sections and connecting boards, N, as constructed, when used for the purpose set forth.

Third, The frame sections, A, having a concavity, a a', at its top, slanting board, b2, and receptacle for feed box, D, ventilating screens, h and c, with door, b, and adjustable bottom, c1 c2, when constructed and arranged in the manner and for the purposes specified.

Fourth, Providing the under part of the beehive stand with rubber bands, x, or their equivalents, in the manner substantially as specified and for the purposes set forth.

Fifth, The feed box, H, constructed as herein specified, having a lid with screen, w, and cleats on its under side for allowing a space between the said lid and the box for the egress and ingress of the bees, as specified.

65,523.—BOLT CUTTER.—Wm. W. Wright and John Boody, Ellsworth, N. Y.

We claim the combination and arrangement of the bars, A and B, lever, E, plates, C and D, and spring, F, constructed and operating in the manner and for the purpose specified.

65,524.—HEATING STOVE.—Thomas Yates, Dubuque, Iowa.

First, I claim the arrangement of the open-top fire-chamber, A, in combination with the upper draft-chamber, f f, so that the draft can be directed around the fire-chamber, A, as specified.

Second, The arrangement of the two dampers, g and h, in the upper draft-chamber, f f, so that the draft can be changed in the different directions, as specified.

RE-ISSUES.

2,633.—METHOD OF PRODUCING MOSAIC VENEERS.—Otto Heinigke and Moritz Laemmel, Bay Ridge, N. Y. Patented May 29, 1860.

First, We claim the within-described method of producing mosaic veneers from strips of any desired cross section and of various colors, said strips being formed by pressing a suitable plastic material, which will harden after having gone through the whole process, through openings of the required shape, substantially as and for the purpose described.

Second, Uniting the strips formed as above described into blocks, G, a cross section of which represents the pattern to be represented by the mosaic veneer or a portion of the same, substantially in the manner and for the purpose specified.

2,634.—SKIRT.—J. E. Lucas, J. P. Arey and Charles G. Howard, Springfield, Mass., assignees by mesne assignments of William Heppenstall. Patented Oct. 30, 1860.

We claim a woven skirt having hoops or wires inserted into woven pockets and having woven into the weft, draw strings or threads composed of larger or stouter warp yarn than that of which the web generally is formed, substantially as specified.

2,635.—HORSE-POWER.—Stuart and Adeline Perry, Newport, N. Y., assignee by mesne assignments of Stuart Perry. Patented July 21, 1863.

We claim in the combination of an endless chain with a pulley driven by it and so made that while a bed or bearing furnished with projecting teeth or ribs receives one class of links in such a way as to prevent their slipping, a revolving portion of said pulley shall receive the other or connecting links that hold relatively opposite positions with regard to the other class, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, the steel or chilled teeth or ribs on said pulley, substantially as and for the purpose described.

We also claim the combination of an endless chain and a pulley driven by it when said pulley is furnished with pieces inserted and moving for the purpose of preventing the chain from slipping and to make better adjustments and thus increase the durability of the chain and other parts working with it, sub-tantially as described.

We a so claim, in combination with an endless chain and a pulley driven by it, said pulley being furnished with teeth, ribs or recesses to prevent the chain from slipping, a device that is moved or governed in such a way when the power is operated that it takes up the slack of the chain and makes a more uniform tension, substantially as described.

We also claim, in combination with an endless chain and with a ribbed, toothed or recessed pulley driven by it, guide pieces to guide the chain as it passes from the driving wheel accurately into or upon said pulley, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, a wheel or wheels so placed as to hold the links of the chain in the recesses or between the ribs or teeth of said pulley, substantially as described.

We also claim the combination of an endless chain with one or more pieces or pullies so constructed with a narrow groove as to admit the projecting parts of the alternate links of a coil chain while the connecting links rest upon the periphery on each side of the narrow groove to prevent the twisting of the chain, substantially as described.

We also claim, in combination with a sprocket or main wheel and chain, a screw buckle, or its equivalent, for taking up the outer ends of the arms in firmer position, tightening up points and for keeping all the parts "taut," as also for loosening up the parts when said wheel is to be taken down for transportation, substantially as described.

We also claim, in combination with an endless chain and a ribbed or notched pulley driven by it, the metallic forks to receive and carry said chain, and an apparatus to take up the slack of the chain, and guide the chain to the pulley, substantially as described.

We also claim the combined use of the upper and under metallic arm holders having suitable provision to receive the inner ends of the arms, and the upper holder pivoted on the top of the center post of the large drive wheel, substantially as and for the purpose described.

We also claim arranging the arms of the drive wheel in pairs vertically one over the other for giving great stability to the wheel, substantially as described.

We also claim, in combination with an endless chain and a drive wheel, the use of sockets to hold the outer and inner ends of the arms of said drive wheel, substantially as described.

We also claim the use of sockets to hold the outer ends of the drive wheel arms to facilitate the setting up and taking down of said wheel as well as to strengthen it when up, substantially as described.

We also claim the use of iron tie rods at or near the extremities of the arms of the large driving wheel for tying said arms in combination with an endless chain, substantially as described.

We als claim construct ng the large drive wheel with sockets and tie rods and a screw buckle in such manner as wholly or partially to dispense with the use of bolts and keys, and thus facilitating the setting up and taking down of the wheel when used in the field or when it is to be transported, substantially as described.

We also claim, in combination with an endless chain and a recessed and ribbed pulley driven by it, one or more metallic arm holders for holding the inner ends of the arms of the drive wheel on which the chain works, substantially as described.

We also claim, in combination with an endless chain and a sprocket or drive wheel and a recessed or toothed pulley driven by said chain, a piece or part that moves while the power is working to take up the slack, and a series of arms in pairs for giving greater stability to the wheel and more facilities in use, substantially as described.

We also claim, in combination with a sprocket wheel and a driven wheel, pulley or drum, a case hardened steel or cemented chain for the purpose of preventing its being unduly cut or worn away and thus increasing its durability, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, a wheel pulley or deflecting device for changing the directions of the chain as it passes from the main wheel to the power transmitting pulley for the purpose of giving the chain to further encircle the driven pulley by giving it more "bite" or contact therewith, substantially as described.

2,636.—PRIMING METALLIC CARTRIDGE.—Horace Smith and Daniel B. Wesson, Springfield, Mass. Patented April 17, 1860.

We claim a primed cartridge case composed of two parts, viz.: 1st, a flanged case or shell of one piece of metal and of sufficient length to hold the fulminate, the propelling charge and the projectile, and 2d, the fulminate arranged substantially in a ring form at the base of said shell in contradistinction to being distributed equally or thereabouts over the entire base, the said two parts being combined and arranged substantially as before set forth.

We also claim a complete cartridge composed of the following parts; viz.: 1st, a flanged case or shell of one piece of metal and of sufficient length to hold the fulminate, the propelling charge and the projectile, 2d, the fulminate arranged substantially in a ring form at the base of said shell as aforesaid, 3d, the propelling charge: 4th the projectile, these four parts being arranged and combined substantially as before set forth.

2,637.—APPARATUS FOR GRAINING PAILS.—John R. and

Alfred J. Cross, Chicago, Ill. Patented December 27, 1864.

First, We claim an elastic bed of any suitable material whether curved or rectangular in form, when arranged in a series of distinct staves or designs, substantially as and for the purposes specified.

Second, We claim constructing the said bed of elastic material in the curved form shown, to be applied as described whether said bed be arranged in a series of distinct designs or in one general design, for the purposes set forth.

2,688.—FENCE.—Theodore E. King, Painesville, Ohio. Patented June 26, 1866.

First, I claim the plate, C, when used in co-relation to the picket and rail either in a series or singly with its intaglio surface corresponding to the conformation of the said picket or rail, substantially as and for the purpose set forth.

Second, I claim strengthening the fence panels and uniting the pickets and rails thereof by means of plates or sets of plates figs. 3 and 5, and so arranged at right angles to the picket and rail, that in combination with the same the said plates s all form a series of supports to the panel sections, substantially as specified.

Third, I claim the plate fig. 3 or its equivalent when so arranged in relation to the rail that the said plate shall form an extension of the picket above, and constitute a brace or support for the fence panel in conjunction with the picket and rail, substantially as set forth.

Fourth, I claim the adjustable hinges constructed with the depressions, a a s, and slots, U U, substantially as shown in figs. 10 and 11, in combination with the tooth, b, and screw holes, e c, of the lower plating of the gate as herein described and for the purpose specified.

Fifth, I claim the adjustable catch as shown in figs. 14 and 15, provided with the screw bolt, W, and stud, X, in combination with the opening Y, of the post and constructed and arranged as and for the purpose set forth.

2,639.—MOWING MACHINE.—Charles C. More, Pittstown, N. Y., assignee by mesne assignments of E. F. and J. Herrington. Patented April 9, 1861.

First, I claim a shoe brace which is rigidly attached to the finger bar and which extends backward between the drive wheels on a line parallel or nearly parallel with the side of the main frame and is hinged at its rear end to said frame.

Second, Connecting the finger bar to the shoe brace which is hinged at its rear end to the main frame in such manner as to allow said finger bar to rise and fall at each end independently of the other to conform to the surface of the ground over which it is drawn.

Third, The lateral brace rod in combination with the shoe brace, substantially as and for the purpose set forth.

Fourth, The combination in a forward cut machine of a hinged cutting apparatus with the main frame in such manner that both ends of said cutting apparatus, each end independently of the other, may be raised by the attendant on the machine, by the operation of a single lever.

Fifth The combination of a lifting mechanism with a hinged cutting apparatus in such manner that said cutting apparatus may be raised or turned up into a vertical or nearly vertical position for passing obstruction by the operation of a single lever by the driver on his seat on the machine.

Sixth, A lifting lever provided with an internal segment rack for the purpose specified.

Seventh, A lifting lever provided with a segment rack in combination with a foot latch for holding said lever as described.

Eighth, The combination of a lifting lever with a hinged cutting apparatus which can be turned up by the side of the machine and a foot latch for holding said lever when the cutting apparatus is raised.

Ninth, The foot rack or bar or its equivalent operating upon the heel end of the cutting apparatus to hold said end while the point of the cutting apparatus is being turned up as set forth.

Tenth, The combination of the foot rack and the segment lever or their equivalent for the purpose specified.

Eleventh, The employment of a spring for holding the foot rack out of gear or lock, when not in use, to allow the cutting apparatus to follow the surface of the ground over which it is drawn.

Twelfth, The arrangement of pinions on the opposite ends of the counter shaft, in combination with a mechanism for simultaneously throwing said pi ion into r out of gear.

Thirteenth, The employment of the pivoted levers, 33 33, forked at one end and operating in the manner and for the purpose specified.

Fourteenth, The employment of the wedge, 65, for the purpose specified.

Fifteenth, The double horizontal hinged connection between the heel of the cutter bar and the connecting rod.

Sixteenth, The reversible wedge or its equivalent for changing the angle of presentation of the cutters to the ground.

Seventeenth, The combination in a harvesting machine of the following elements viz.: a main frame, an independent seat and tongue frame and a hinged cutting apparatus which is free at each end independently of the other end thereof to rise and fall on the main frame, to follow the surface of the ground over which it is drawn.

2,640.—GRAIN DRILL.—Worden P. Penn, Jacob Geiss, and Jacob Brosius, Belleville, Ill. Patented June 27. 1865. Antedated Dec. 27, 1864.

First, We claim bracing the drill toothed to its drag bar by means of a separate brace in such a manner as to allow it to fold forward without breaking the wood pin, substantially as set forth.

Second, The arrangement of slides, C, fixed plates, d, with check pieces, c2, and movable plates, d1 d2, in combination with the hopper, all consructed, arranged and operating in the manner and for the purposes specified.

Third, The construction of agitating slide with double beveled projections, e' e' and c caning pins, c2, in combination with the divisions, a a, vibrating hangers, I, and seed distributing devices shown, substantially as and for the purposes specified.

Fourth, The long cut off plate, d, arranged with the plates, d d' and slide, C, and combined with the drill teeth by means of the pivoted vibrating bar, E, and chains, g and operated by a handle, E' all in the manner and for the purposes specified.

Fifth, The pendent stand board, J, arranged substantially as described, upon a seed drill for the purposes set forth.

2,578.—SEWING MACHINES.—Alfred B. Ely, assignee of Reuben W. Drew, Newton, Mass. Patented Nov. 5, 1861. (Div. A).

1st, I claim rotating and operating positively the thread-guide within a supporting horn for entering the work so that the thread shall be laid in the path of the hook of the needle, whatever the form, direction, or length of seam, by means substantially as described.

2d, Rotating and arranging the thread guide or whir, by means of a geared rod, constructed and operating substantially as and for the purposes described.

3d, The combination of sliding cam, L, rack bar, N, rod, O, and whir or their equivalents, substantially as and for the purposes described.

4th, So constructing and arranging the guide in relation to its actuating devices that it may be rotated and operated by a geared rod, substantially as described.

5th, The combination of a horn for entering and supporting the work with a rotating geared rod for operating the whir, and a whir for presenting the loop to the barb of the needle, substantially as described.

2,579.—SEWING MACHINES.—Alfred B. Ely, (assignee of Reuben W. Drew), Newton, Mass. Patented Nov. 5, 1861. (Div. B).

1st, I claim so constructing and so arranging the parts of a sewing machine in combination with a main operating shaft, that the needle bar when positively or directly attached or coupled to its actuating arm can be revolved positively and freely above the work, and to any desired extent in the direction at the will of the operator as the stitching progresses, and be made to operate for any length of time at any position of its revolution by means substantially as described.

2d, So constructing and arranging the needle bar and the feeding point that they can be revolved either way together and preserve their relative positions.

3d, So constructing and combining the rotating needle bar with the feeding point that the feed shall form a guiding point to the needle and space the stitches.

4th, The combination of the spring cast-off needle and feeding point when constructed and arranged substantially as described.

5th, The adjustable eccentric with its connections or their equivalents for a tering and adjusting the t row of the needle bar.

6th, The mechanism substantially as described for revolving the needle, or it and the parts connected therewith, or presenting them properly to the work by hand that the seam may be laid in any direction as the sewing progresses.

7th, Revolving the needle bar automatically by means substantially as described

2,580.—SEWING MACHINES.—Alfred B. Ely, (assignee of Reuben W. Drew), Newton, Mass. Patented November 5, 1861. (Div. C).

1st, I claim so constructing and so arranging the parts of a sewing machine in combination with a main driving shaft, and so combining the operations of the needle and thread guide, actuated substantially as described, that any change of position of the needle to the work shall be accompanied by a corresponding change of position of the thread guide in sewing either way and to any desired extent in either direction, substantially as set forth.

2d, In combination with a work-supporting horn, substantially as described, I claim so constructing and arranging the parts of a sewing machine that while in the sewing of curves and angles the barb of the needle shall be made to enter and pierce the work across the line of seam, the whir shall be revolved and operated so as to lay the thread across the needle barb along the line of seam, substantially as set forth.

Third, The comb nation of cam cylinders, S and L, or their equivalents with their co nections, substantially as and for the purposes described.

Fourth, the sliding cam, L, for changing the position of the whir operating mechanism, substantially as described.

Fifth, The combination of a hook needle for seizing the loop, with a horn for entering and supporting the work, a geared rod for operating the whir, and a whir for presenting the loop to the needle, substantially as described.

Sixth, The combination of hooked needle cast-off for shedding the loop, and feeding device for feeding the work with the horn geared rod and whir, substantially as described.

DESIGNS.

2,661.—CENTER PIECE.—Henry Berger, New York City.

2,662.—COOK'S STOVE.—A. E. Chamberlain and John B Crowley, (assignors to Chamberlain & Co.), Cincinnati Ohio.

2,663.—TRADE MARK.—Giles F. Filley, St. Louis, Mo.

2,664.—SPOON OR FORK HANDLE.—Alonzo Hebbard, New York City.

2,665.—PENDING WHEEL.—Charles Kirchhof, Newark, N. J.

2,666 and 2,667.—TRADE MARK.—Samuel McCartney, St. Louis, Mo. (Two patents).

2,668 and 2,669.—BURIAL CASE.—Bernard Smith, (assignor to American Burial Case Company), Cincinnati, Ohio. (Two Patents).

2,670.—TRADE MARK.—Henry Tetlow, Philadelphia, Penn.

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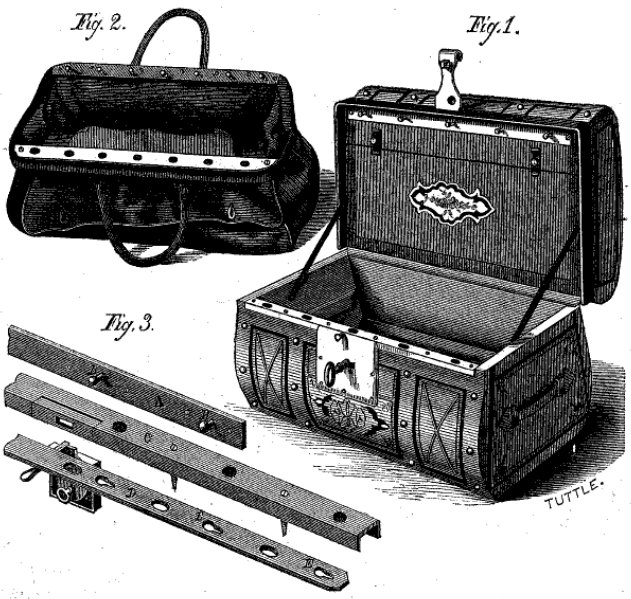
Fig. 1 shows a trunk with this device and Fig. 2 its application to a traveling bag. It is easy, from a description of the device, to see how it may be modified to suit all cases. Fig. 3 exhibits the parts detached. On the inside of the lid is secured a metallic strip, A, in which are riveted pins, B, having heads and short shanks. On the lower or corresponding edge is screwed a plate, C, forming in its cross section three sides of a parallelogram. Inside this is a sliding strip, D. The holes in the strip, C, permit the entrance of the pegs, B, the heads of which pass through the pear-shaped holes, E, in the sliding plate, D. The oblong holes in D, intermediate between the others, permit the movement of the plate where the screws which fasten, C, pass through into the wood.

The action is very simple. As seen in Fig. 1 a small knob attached to the sliding plate projects through the front of the trunk, by which when the pegs, B, have passed through the sliding plate it can be shifted so that the small ends of the pear-shaped holes embrace the shanks of the pegs and hold the lid firmly. The turning of the key locks this sliding plate as well as the hasp of the lock, and when the trunk is locked the knob by which the plate is moved is covered by the hasp. Thus the plate is held in place when locked so that no portion of it can be disengaged from the pegs until the key is turned and the knob uncovered. The apparatus can be so modified that the turning of the key alone will make the connection between the lid and trunk without the employment of a projecting knob.

Patents were granted for this improvement through the Scientific American Patent Agency, for this country Oct. 2, 1866, and in Great Britain April 9, 1866. For rights and further particulars address William S. Paddock, patentee, Albany, N. Y.



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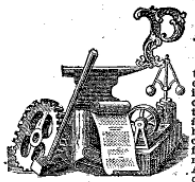

PATENTS

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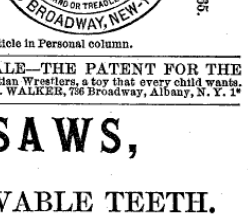

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